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Editorials

THE VALUE OF FOREIGN TRAVEL.

An article in our columns this month by Dr. H. Moltzer-Nielsen, of Copenhagen, will be read with much interest by those of our readers who propose this year to include in their summer holidays a visit (or visits) to some of the Continental Veterinary Schools. Comparisons may be odious, but the description given in simple language by our Danish colleague makes one feel envious of the advantages which are laid at the feet of our Continental colleagues by the providing of well-equipped and excellently designed Colleges, thus giving a self-respect and pride at the very commencement of their professional careers, and the opportunity of a groundwork which could not possibly be obtained otherwise.

The backwardness of Great Britain in this respect cannot be imagined by those who have not seen the actual state of affairs for themselves, and it is to be hoped that those who can, will make time to take what is really an education and a profitable holiday by the inclusion of a visit to some well-known Continental Veterinary Institution in a holiday abroad. The actual cost is very little more (if any) than a holiday in England, and the language difficulty is negligible, for the aptitude of our Continental confrères in the study of English is well known, and the cordiality and genial welcome which is always given to an English colleague does away with any shyness which may appear at first to hamper attempts at conversation from either side.

NATIONAL DOG WEEK.

A short time ago a suggestion was thrown out in certain philanthropic circles that if good, sound, serviceable, ideas regarding the dieting, general hygiene and management of dogs were better known, these friends and companions of man would be materially benefited. It is estimated that there are approximately 3,500,000 homes in England owning each at least one dog, and every veterinary surgeon meets, almost daily, with instances in his own district of discomfort (and at times actual cruelty) quite unintentionally and unnecessarily inflicted upon dogs. It is with the idea of helping to do away with

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these mistakes that the "National Dog Week" scheme is being promulgated, its aims and objects being:—(1) To focus public attention intensively for a brief period (by methods calculated to create a lasting impression) upon dogs and their essential needs. (2) To educate dog-owners generally as to their responsibilities, both to their dogs and to the rest of the public. (3) To disseminate knowledge of correct principles of dog management and hygiene. (4) To inculcate in the young a kindly feeling towards animals in general and dogs in particular. (5) To impress upon adults the cruelty of turning dogs out to become strays, keeping dogs perpetually chained up, withholding facilities for proper exercise, and like practices, still unfortunately far too common. (6) To minimise such prevalent abuses as dogs roaming without proper control and the fouling of footpaths. (7) To assist financially the institutions devoted to the welfare of dogs.

The latter paragraph especially interests the members of the veterinary profession at the present moment, as during the week set aside in this year (September 23rd to 29th) the proceeds of Flag Day Appeals, to be made wherever they can be arranged, will be handed over to the Royal Veterinary College Rebuilding and Endowment Fund; as the urgent necessity for the reconstruction and rebuilding of the College is now becoming well known. Another year the financial proceeds will be allotted to some other deserving Society or Institution which is known for its good work towards animals.

Members of the veterinary profession throughout the country will be asked individually and collectively to lend their support by allowing their names to appear on local committees and by actively giving help in whatever manner they can, whether in the form of a lecture, or by quiet propaganda in other ways. Officials are already busy in many towns arranging and organising, and the scheme is especially "practical," and free from the wishy-washy sentimentality which so often spoils what would otherwise be real good work.

Propaganda for the dog means propaganda for the veterinary profession, as it is in this way that the general public can be educated to the value of skilled veterinary help in cases of illness and preventable disease.

Altogether, the scheme appears likely to be as great a success in the practical benefits it will confer on dogs and in increasing their value and respect in the eyes of the British public, as has "National Baby Week" in the benefits it has conferred on the health and babyhood management of the children of the Empire.*

* Full particulars of the scheme can be obtained by writing to the General Organising Secretary, Capt. Hobbs, 37-38, Temple Chambers, Temple Avenue, London, E.C.4.

General Articles

IMPRESSIONS OF A VISIT TO SOME OF THE CONTINENTAL VETERINARY SCHOOLS.*

By H. MOLTZEN-NIELSEN,
Copenhagen.

PART I.

DURING the first four months of the year 1927 I visited the Veterinary Colleges of Central Europe in order to study animal surgery. During my travels I tried, as far as possible, and over as wide an area as possible, to acquaint myself not only with the examinations and methods of study prevalent in these schools, but also to get into touch with the veterinary surgeons themselves, and study their organisations and practical work.

Berlin.

The first town that a Dane would naturally stop at would be Berlin, and, most fortunately for me, barely six months before my visit, a completely modern-equipped surgical clinic had been opened as a first step towards the reconstruction of the more or less antiquated Academy or High School. The new three-storied building, which is constructed in modern style, with yellow rough-cast stone and reddish brown window frames, is 100 metres long, with one façade facing on to Hannoversch Street. The whole ground floor forms one long stable which can be divided, by sliding doors, into four compartments and is capable of housing 50 horses. Both boxes and exercise ground are roomy and solid and well arranged with clinker floors and glazed tile walls.

In one wing of the building is a section containing 10 stalls in large peat moss littered boxes for patients suffering from diseases of the hoof. From the riding school one enters the examination section furnished with a simple stall (on the Hauptner model) containing a heating apparatus. One side of this stall opens into the waiting-room for the patients' owners, and this again opens into the stables.

On the opposite side there are sliding doors opening into the operation room, 10 by 10 metres, but owing to its high windows and top light it appears much larger than it is. Along one side there is a Vinsot's apparatus, along the other lies a large (about half a metre high) leather-covered mattress for the patients, with Danish

* Translated from the "Maanedsaskrift fur Dyrlaege," May, 1928, by F.M.

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and German hobbles. The cleaning and sterilization of the instruments takes place in a separate room, communicating with the operation ward; out of which leads a small door into the Röntgen ray section, which is equipped with modern circulatory ventilating system.

The whole arrangement is so convenient that, if necessary, restless horses can be X-rayed whilst confined in the Vinsot apparatus. It is worked exclusively with "Coolidge tubes" and, if preferred, can be used with softer rays and longer exposure. There is, also, in the Clinic a very practical arrangement by which the horses can be given both foot baths and douches, and can have big wounds, fistulæ, etc., cleansed also.

There were no students in the Clinic during my visit, as the 200 students (among whom there is one woman), were all working in other departments. (So far, Germany has two women graduates, one of whom is an assistant in the medical Clinic at Berlin.)

It was a pity that there were no students present to gain experience from the large number of horses (the largest I saw, at one time, during my journey), who furnished varied and abundant cases of surgical treatment. The 60 compartments of the Clinic were all occupied, and many patients had to be refused admittance.

The examination of the patients was systematic, although scarcely so thorough as that inculcated among our own Danish students. In connection with the diagnosis of lameness, perineural injections played a great part. But great care was taken that the horses' paces should be tested only on a perfectly even surface, as there have been sad experiences of not doing this, in forms of fractures of the hock and pastern.

There were a great number of operations, all performed by Prof. Dr. Silbersiepe. The only exceptions were castrations, which were done by senior students. This operation was performed with a very strong emasculator on the "covered" testicle, after which the superfluous skin was removed with scissors. It is also done with the elastic Derby ligature (Dr. Schöpper's method). This acts in the same way as the older method with the clam, but is not so successful, as the stump rises into the scrotal wound and causes suppuration.

There is also the new Eschini forceps on the same principle as Burdizzo's, except that the notches are placed lengthwise, and it is provided with a fixing arrangement for force in case of need.

Prof. Silbersiepe had, in his earlier days, been familiar with the castration of horses in the standing position. This method is reserved here for two-year-olds and ponies, and seems to have won wide recognition among the practising veterinary surgeons.

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The operations are all performed under chloral, as a narcotic, supplemented by local anæsthesia, especially for hoof operations. The horse is kept thirsty for two days, and the evening before the operation some common salt is put in his food. I consider this method troublesome and less humane.

Many animals will not eat when they are thirsty, so about ten minutes before they are cast, they are offered a bucket of water with 35 to 50 grammes of chloral. Then they receive the same amount of chloral intravenously in 10 to 20 per cent. solution. The result is good and I find no disadvantages from it.

Almost all operations upon the extremities—which are commonest among horses—are performed while the horse lies bound in Vinsot's apparatus. It can easily be realised that this method is very convenient, and makes it much easier for the operator, than the confinement of the horse, as is necessary with the "Berlin hobbles." The whole operation is performed with two or three men. It may be also mentioned that the danger is no greater than with the other methods of restraint. Here it is used only for operations on the extremities, but in other countries I have seen it used quite as successfully in operations on far more inaccessible parts of the body. Most of the Veterinary Colleges are now supplied with one, or even more, of this apparatus. It is gaining ground in the estimation of many operating surgeons, not only in France, but in the Germanic countries, and students are, naturally, being instructed in its use.

Hitherto disinfection has consisted of rubbing with sublimated spirit and painting with iodine, but this method is not sufficiently effective for the disinfection of hoofs. In Germany the dressing for hoofs is generally made of tow and sterilized cotton wool, and it is changed very frequently. Besides a number of operations on limbs, I assisted at some throat ones done by the Williams-Eberlein method and at one simple cryptorchid done by Dégive's method. There were also several minor operations at which I was present.

The chief lines on which the work runs here in regard to fistulous wither, as in most of the other colleges I visited, are mainly the conservative ones. During the Great War most of the curative measures were abandoned, possibly owing to changed times and unfavourable conditions, and we left it to Nature herself to fix the line between sickness and health. A typical example of this was fistula of the withers, which is common here. External resection as a routine measure has been abandoned. Treatment is restricted to bathing, opening the abscess and extracting the loosened matter; and the results are as good as that obtained by radical treatment. Naturally, many radical operations were performed, as in the case of quittor,

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where the cartilage was removed by the Bayer method; by simply operating upon the coronet in front.

Extraction of the teeth was usually performed when the horse was standing, preferably with perineural injections of novocaine (10 to 20 c.cm.) into the *canalis infraorbitalis* or *mentalis*, which is simple, and, as a rule, works successfully. I have myself used this frequently, once for the removal of an epulis in front of the under jaw, when injections in both *Canals mentalis* caused complete anæsthesia. I prefer to inject through the mucous of the mouth rather than through the external skin.

For evacuating the alveolar cavity it is convenient to use a 60 centimetre long, strong but slender, rod, one end of which is fitted into a circular handle, the other end forms a right angle of 6 cm. long and 1 cm. broad; this is introduced into the alveolus and extracts the fragments of teeth.

Practice in operation work was carried out in all the essentials like it is in Denmark. For teaching purposes, films are constantly being made of rare and interesting cases. I had the opportunity of seeing some portraying various kinds of lameness. Some were most instructive, especially in connection with locomotion, where the action was given in "slow motion."

The medico-forensic clinic which, after the death of Prof. Fröhner was taken over by Prof. Neuman-Kleinpaul, is still housed in the great dark stable, but has many patients. Berlin is one of the few large towns which still employs a number of horses as well as motor vehicles. There are still 45,000 horses as against 50,000 in 1913, and they show no sign of decline.

The clinic for small domestic animals, run by Prof. Hintz, is divided into three separate departments—internal, external, and skin diseases. Each of them contains an out-patients department.

The ambulatory and the obstetric clinics are under the direction of Prof. Schöttler, *pro tem.* principal. They stand in need of immediate better housing conditions, as these are at present far too constricted. For example, practice in embryotomy has to be conducted on a table in the lecture room. I experienced this deficiency when I went to practise the use of the new instrument called "Becker-Schöttler's Vacufact." While formerly, as a rule, one attacked the limbs of the fœtus, in the German schools they work now to dismember the body itself. For this purpose they use this instrument called the "Vacufact," which is an aluminium cylinder 70 cm. long, tooth-sawed at one end. After the head is removed the instrument is steered by a harpoon into the spinal canal. The cylinder cuts the column as far as the kidneys and the body falls to pieces. A method

has since been adopted by which this instrument can be used in cases of retarded dystokin. The practised and skilful head assistant, Dr. Strothoff, performs this operation quickly and successfully; but time will decide whether this method will supersede the earlier one.

The travelling clinic practises only on cattle, but its work is of great importance as a source of instruction; for it has a copious, though somewhat one-sided, material to work upon. More than 30,000 cows are located in the suburbs of Berlin. We find them in the so-called dairies, each containing from 10 to 70 animals. The cows, which are of very varied breed, are kept for milk, for fattening, and for slaughter. The usual veterinary work includes obstetrics, parturition, mastitis, etc., and covers a wide area. There is, of course, no practice in this section of sterility; but the students study that branch in the special byre for cattle in the College here. The control of this branch has nothing to do with the clinic as it is in charge of the city police veterinary department. The conditions under which milk is controlled in this Department are not entirely satisfactory, for the milk is sold direct from the cowshed. It is, however, cheaper than that sold in the big dairies.

Five years ago instruction in the management of small animals was separated from the obstetric section and was made an independent branch under Prof. Stang. Here, as everywhere, may be seen the great increasing interest in this section of the work. In Hanover, the students may spend two months on a State farm to study the habits of small animals. A similar arrangement is about to be started in Berlin. German veterinary graduates now have the right to hold posts as inspectors of animal breeding as soon as they have passed their examination in this subject.

Hanover.

Another large veterinary college in Germany is at Hanover. It is the most popular, having 250 students. I visited it on my homeward journey. It looks much the same now as it did when first started at the end of last century. It needs much more space and requires to increase its superficial area enormously. In the meantime, the department of normal and pathological anatomy has been greatly modernised (Profs. Zietschmann and Lund). The pathological section now possesses a new and well-arranged hall.

The clinic is on the same lines as that of Berlin. It is now about a year since the ambulatory clinic became independent under Prof. Hupka; while Prof. Götze retains the obstetric section. Here the treatment of traumatic indigestion in oxen is receiving very great attention.

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The first important point about this disease is a very exact diagnosis. Besides general symptoms, attention must be paid to reaction to percussion. As the X-rays cannot always, with absolute certainty show foreign bodies, laparoscopy is employed. Through a small opening in the abdomen, a long endoscope is inserted, by means of which the process of inflammation can be determined, also the adhesions and the foreign body. The old method—Obich's operation through the left flank—is now abandoned, and replaced by Kübitz's method, with the resection of the 11th rib on the left side. This can be performed on a standing animal with anæsthesia of the intercostal nerve. As against Kubitz, Götze maintains that the chief thing in the operation is to remove the foreign body as well as the adhesions; and therefore he performs the operation on the cow when cast and lying on its back, and enters between the curve of the ribs and the central line. This gives a good view and makes it possible, if necessary, to draw the piece of the stomach forward; and, by means of an incision, to remove the foreign body. Naturally this is only used in the case of specially valuable animals; a safer method is much to be hoped for, and we look forward to further developments along this line with interest.

Sterility does not seem to be a subject of great interest in this section. The treatment of mastitis is being investigated with several of the means at our disposal, for rivanol and uberasan are out of date.

In the canine hospital (Prof. Künnemann), I saw one operation for abscess of the prostate, but the dog died. For examination purposes intravenous chloral hydrate is used, but it is apparently a very uncertain material in the case of small animals.

The medical clinic is planned on the same lines as the surgical. Prof. Oppermann is in charge of the former; Prof. Frick of the latter. The surgical clinic consists of a large, rather dark, room with an asphalt floor. Here there is a loose box which can be moved to give place to a large mattress placed on the floor. Owing to the vacations, there were very few patients and scarcely any operations. There is a great demand for surgical work both in the town and the suburbs among the horses of good breed.

In the clinic the Röntgen Rays are extremely up to date and much used, but only under the special guidance of the chief assistant, Dr. Henkels. The screen is used for the raying of dogs, for which it is specially suitable. It is a sort of table where the animal rests on a plate under which the X-rays work. In the case of horses the instrument is protected by a covered box; other places have abandoned this.

Leipzic.

On my way south I spent a few days at Leipzic in order to visit the most modern Veterinary College in Germany, as the Faculty of

Veterinary Medicine was only attached there in 1923. The instruction for the veterinary student is in all elementary essentials the same as for medicine. It is held in the town, while the rest of the instruction is given in the University Animal Clinic in the new College, a very fine building which lies south of the town, midway between it and the large church and war memorial. The neighbourhood of the College is very convenient for the National Library, where you can obtain every kind of printed matter. I was astonished to see the loneliness of the surrounding country, but I understood it when it was explained to me that the College was planned before the war, when it was thought that its inauguration might attract the town out towards it. However, the difficult economic situation put a stop to this, and has retarded a fresh start in this direction. It does not really affect the Clinic itself, as its largest clientele is drawn from the prosperous outlying farm districts quite as much, if not more, than from the town.

The College is well situated in the centre of a pleasant open square, and gives a good impression with its grey façade and dark unpointed brickwork. It is big—indeed, almost too big—for its 110 students, with which small number it had to begin, owing to the dear cost of living and the difficulty of finding houses in the solitary neighbourhood.

The sections, which nearly all have their own buildings, are handsome and well equipped. Some sections, however, are still suffering from unfulfilled desires, for their buildings are not yet more than planned out, although two are now being proceeded with.

The clinical section is somewhat complicated. There is a medical clinic for horses and dogs (Prof. Johs. Schmidt) and a corresponding surgical one (Prof. Roder). In both clinics there is an out-patients' department for horses, but the dogs have their own under the guidance of Prof. Reinhardt. Finally, there is an ambulatory clinic (Prof. Weber); and an obstetric clinic under Prof. Richter, who is also instructor in the treatment of small animals. These sections are in the biggest building of the group. There were, unfortunately for me, very few patients in the obstetric clinic, and the breeding stable was empty.

The surgical clinic has two departments—the laboratory department and the clinical department. The latter is on the same model as that of Stockholm. It has an examination hall, 50 yards long, laid with a wooden floor, and having doors on either side opening into stalls capable of housing 40 horses and 30 dogs. The corridor leads to a rather gloomy room where the patients are examined; then on to two operating theatres, which are not very large. In one of these Vinsot's apparatus is installed, and in the other, the operation mattress which can be moved hydraulically, as can also the canine

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operating table. No great distinction is made between septic and aseptic operating rooms. The horses' narcotic was chloral, which was given dissolved in one litre of water, by nasal insertion of the sternal tube. This is easily carried out by a practised hand, and I was told that the risk of danger was infinitesimal.

The Clinic has a Röntgen-ray instalment, which is presided over by the head assistant, Dr. Berge. Copious and up-to-date material is to be found in these somewhat constricted premises. A new arrangement is now used for photographing the small animals. The animal is secured by hobbles on a table; between this and the film camera a Bucky-Bland wheel moves. This consists of thin strips of lead placed separately in a wooden rim. As the X-rays pass through these bars, secondary rays can be stopped, which otherwise would spoil the picture. Röntgen films play a great part in this section.

Besides the above-named three colleges, Germany has Veterinary Faculties in Giessen and in Munich, each training about 100 students. There are slight differences in the arrangements of the various sections; but the chief point is that for all the course must occupy nine terms. After the first three terms an examination must be passed in the usual rudiments of fundamental science. One year later they must pass in anatomy and physiology. The final, or State examination, is held at the close of the ninth term; as a rule it can be passed in six weeks, but it sometimes requires a whole term. Each section, or subject, forms a separate unit; so that it is only necessary for the student who has failed in one subject, to enter again for that single subject.

After passing the qualifying examination, the graduate has to be approved by the Ministry, and his first step then, as a rule, is to defend his thesis, which he has been preparing while still a student, or working as a voluntary assistant in one special section. There are many opportunities for further practice in this way, as each section of the colleges has at least three or four assistants. The outlook for young veterinarians is not, at present however, very bright. Not only is the competition very great, but there are many charlatans. Numbers of these so-called "veterinary assistants" went to the War as military veterinarians, and were often left to their own devices without any professional veterinary officer at their side. Now, however, in Germany, the profession has organised for war on these "body snatchers"!

After practising for one year, spending three months in a public abattoir, and going through a two-months' course in the hygiene section with its resultant examination, the graduate can at last start on his own as a veterinary official. Appointments dealing with infectious diseases and the supervision of meat and milk are very

important, when we remember that about one-third of the 7,500 members of the profession working in Germany are either whole or part time officials. One must understand that a number of these appointments allow of private practice—a fact which sometimes causes a little ill-feeling among their less fortunate colleagues.

Vienna.

In Vienna the Veterinary College is situated within 10 minutes walk from the centre of the town. It presents a somewhat sombre appearance with its cloister-like building, and together with some of the other houses has a ruined look. It has 350 students now, whereas formerly there were 700. The sad dismemberment of the Austrian Empire and the break-up of the Veterinary Colleges in Brunn and Sofia, has reduced the number of students by half. But still there are too many colleges in proportion to the whole number of veterinarians in Austria—about 900. Up to the year 1920 the College was a military school, whose chief business was to train veterinary officers for the army; but after the Revolution it was put under the Ministry of Agriculture. Then it became a question of either making the College into an Agricultural School or making it a Faculty of Veterinary Science. The professors fought for their rights and are now pleased that they have been able to retain their independence. They are getting on with their scientific discoveries and laboratory work, etc., but, of course, owing to the state of their finances, etc., they cannot go as fast as they wish. They are, however, able to have a good modern X-ray apparatus installed.

Conditions are nowhere quite satisfactory yet, and therefore I was doubly surprised to see the amount of solid work being done. It is often carried on under great difficulties, especially in the normal and pathological anatomy sections (Profs. Skoda and Hartl). The large bodies have to be manipulated on the floor of the section hall; fortunately, however, the students need not remain very long in this department, as only eight small preparations of dog and horse are required during their two-term course.

There is a medical and surgical clinic for small animals and horses, to each of which is attached a small Out-Patients' Department; and there is an Out-Patients' Clinic for small domestic animals also. These are open nearly the whole day, and the patients are attended to by the hospital assistants, who take it in turn. This is purely an economic arrangement and of no special benefit to the students; it does, however, constitute a serious rival to the town practitioners, who were hard hit when the number of horses fell to about one-third of their former number—about 15,000. The Out-Patient Department

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for horses opens only in the afternoons and has in connection with it a department for instruction in shoeing given by Prof. Habacher. There is also a small animal clinic (Prof. Reisinger), which carries on both stationary and out-patient work; and an obstetric section for all animals.

The surgical clinic is under the direction of Prof. Th. Schmidt, well known as the author of the two first volumes of the new edition of "Bayer and Fröhner's Surgery." The clinic, which formerly had 80 stalls, now has only one long stable-like building with 30 stalls which are barely half full. The operation room is situated in the centre of the building; it has asphalt floor, and on one side, under the spectators' gallery, there lies a large straw mattress. It is remade afresh every year, and mended every day. All operations are performed in this room—septic and aseptic. The first kind are, for the most part, represented by diseases of the hoof. The narcotic was chloral rectally given and supplemented with chloroform. For hoof operations local anæsthetics are often used, applied to the plantor nerves. Disinfection was scrupulously performed and the bandages carefully applied.

I saw one aseptic operation—removal of a testicle from an abdominal cryptorchid; he was operated upon by Dégive's method. Cryptorchids are rarer there than in more northerly latitudes. The preparations for the operation were in remarkable contrast to the surrounding conditions. After disinfecting the skin (benzine and iodine) the stallion was completely covered with sterilized cloths. The sore healed without complications, even though the second testicle was removed with a clam. Here it is an invariable rule that every horse castrated must be examined rectally, and, if the opening from the abdomen is passable by more than two finger tips, he is castrated with the clam on the covered testicle. The clam remains 12 days and is removed by cutting the cord immediately above it.

In this college there are lectures daily in surgery and, with the exception of the operation lectures, they take the form of clinical instruction about the patients; failing this method, demonstrations in preparations are given. These lectures are very far-reaching, including many parallels drawn from human surgery (Schmidt is a doctor as well as a veterinary surgeon) and his method is extremely lucid. It pleased me, later on, when present at an examination, to find that the students were not obliged to reproduce all that they had been told!

The examination of the patients was thorough and the treatments effective, and carried out chiefly on conservative lines. Fear of glanders causes every horse to be suspect, and they are all submitted to examination and the "Mallein" test.

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One disease, which happily with us in Denmark has practically disappeared, namely periodic inflammation of the eyes, is very prevalent, especially among horses from the Hungarian marshes. I had an opportunity of seeing it in almost all its forms. It was considered incurable, but Schmidt uses atropine drops, partly to reduce the inflammation and partly to lessen the smarting which, in the case of humans is the result of Irido-Cyclitis. The iodine therapy used and recommended in France has shown itself powerless against this.

For many years Schmidt has used cauterisation for spavin, but he is dissatisfied with results, and prefers Peters' operation (periosteotomy). The original V-shaped cut he makes wider, and then makes another up the centre of it as far as the long middle ligament. One week afterwards he applies a caustic ointment.

Practice by the students in operating takes place on chloroformed horses and on dead dogs, but hoof operations are always carried out on dead horses. There were comparatively few simple tumour growths which required removal. Curiously enough, in Bayer's old clinic I failed to find his own operation for quittor as well as the method of Solleysel-Johann and Möller-Frick. Schmidt maintains that any method which gives the best and quickest results is the most important.

A department for small animals, containing about 25, is situated in a separate building. It has a newly-built Spartan-like but very practical aseptic operation room. On the table was the usual slab or plate supplied with two moveable parallel clips, with sterilized cloth in between. This makes a good bed for the animal, while underneath there is a tray which catches anything that may fall. Thus the floor is never soiled. Some interesting cases were treated here, and, owing to an outbreak of influenza among the students, I had the opportunity of acting as assistant; and this I found of great use to me.

I assisted at about 20 laparotomies, performed in a most efficient manner by the head of the clinic, Dr. Ueberreiter. There were growths in the womb, intestine, and bladder. Some few were with the object of finding injuries in some dogs who had been run over, and these were causing much interest in the clinic at the time. I saw also a number of characteristic lesions, among others removal of the mesentery along the intestine. Resection of a piece of intestine was attempted; the two severed ends were closed and a lateral anastomosis was effected between them, but the dog died.

Very interesting were the cases of enterotomy for the removal of foreign bodies, which are very common during the summer months. I saw a curious collection of stones, balls, lady's gloves, etc., removed

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by this operation, together with Bayer's classic eye preparations. These objects were exhibited at the Vienna Spring Fair in the surgical department arranged by the College exhibitors.

All these operations gave good results, and the patients were able to go home after 10 or 12 days. The narcotic used is chloroform, which is better than ether, and lasts better for long operations; it is administered by drops on Esmarch's mask. All sutures are of silk and appear to cause no discomfort. In case of danger from peritonitis, sterilized paraffin oil is injected into the peritoneum. The chief symptom in this disease—vomiting—is eased by palpation, but controlled by X-rays. These rays play a very important part in the medical clinic.

A few years ago, tuition in obstetrics was separated from diseases of domestic animals; Prof. Keller being the head of the latter section, and Prof. Benesch taking over the obstetric clinic. Here there were dogs of all kinds, some patients, some bought. Hysterectomy and the Cæsarian were performed on the small animals—the latter always through the flank with good results. They were almost always performed under the local anæsthetic (up to 20 c.cm. $\frac{1}{4}$ to $\frac{3}{4}$ per cent. tutocaine). Among the larger animals the diagnosis of sterility and gestation played a very important part. I was shown Hopper's new method of the determination of gestation by inspection of the vagina and the mouth of the uterus. It was controlled by rectal examination also. Albrechtsen's method was employed against sterility, usually after an injection of 30 c.cm. tutocaine solution between the first and second tail vertebræ (extradural anæsthesia). This is a simple method and acts well, producing good anæsthesia of the tail and perinæum. It seems to me that it is not sufficiently pointed out, however, that it has this drawback, that in some cases very susceptible cows remain paralysed for some hours afterwards.

I have, myself, used it in tail amputations and the removal of tumours in the perinæum. (To dogs, give $\frac{1}{2}$ c.cm. cocaine, 2 per cent. It has a very good effect; have seldom found any drawback.)

The medical clinic (Prof. Wirth) can pride itself on an imposing number of patients—both dogs and horses—suffering from colic. I had hoped to have an opportunity of seeing rabies here, but this disease rarely occurs now, although many dogs are interned as suspicious. There is here, also, a clinical lecture room, where the Professors give lectures on the various individual patients. This is a very good method, not only on account of the large number of students, but because of the expense of examining each patient separately.

In Austria, as in Germany, the students' course has now been extended to cover nine terms. At the close of the fourth term, comes the first State examination, answering to our Danish first and second part;

but in addition to this, the students have during this time, been getting a good insight into agricultural subjects. During the remaining five terms they study specially for the veterinary department, and to this has recently been added some knowledge of fish-culture. It requires at least one term to prepare for the second and third State examination. Before this, they will probably have spent about four weeks studying the practical aspect with some veterinary official. The candidate is allowed to state when he is ready and wishes to be examined in a certain subject.

Contrary to the custom in Germany, the examination here is held publicly in the presence of two censors, chosen by the College of Teachers and the Ministry of Agriculture. The result is announced, "sufficient, insufficient" (passed, failed). In the latter case the candidate, as a rule, starts again on his studies for from two to four weeks, and then re-enters for examination in the subject in which he previously failed. Many graduates prepare a thesis, which they defend orally; for the Doctorate, on the other hand, there is a severe test which they must pass in three self-chosen subjects. Graduates can only hold an official appointment after several years' practice; and then only after they have undergone a severe test, concluding with a further course in infectious diseases, hygiene, and jurisprudence in the College. These officials receive a smaller, but certain, salary, and are entitled to practice privately, a privilege which, as before stated, causes trouble between them and the private practitioners.

From associating with these gentlemen during the course of my visit, I received the impression that they live in restricted and somewhat primitive circumstances. There are too many of them; the care of domestic animals is somewhat undeveloped, the peasants are not extremely enlightened, and, above all, there is the vexed question of the charlatans and quacks. They receive no pecuniary help from the meat and milk control business, as the former is managed by the doctors, and any systematic milk testing does not exist.

A fresh economic catastrophe has lately caused an acute situation. In 1919 certain energetic organisers formed a society—The Austrian Veterinary Surgeons' Domestic Economy Association—which in the beginning was confined to the purchase of medicines, etc., but which later developed into a kind of serum institution. To this was gradually added a savings bank, insurance society, and lending society, with the result that the whole house of cards has fallen to pieces with a deficit of a million.

One charming little remnant of fallen greatness, which the Republic cannot bring itself to destroy, is the Spanish riding school which one may still visit in the royal castle. There are now only 30 horses left,

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many of whom must be at least 20 if not older. Every year a few young stallions are brought in from the stud which is now out at Piber. Every morning one can enjoy one of the fashions of the graceful olden days in this beautiful riding school; as the riders, dressed in yellow breeches, brown coats, and three-cornered hats enter the school and show off the paces of their fine snow-white old stallions. Later we may also watch the young dark grey stallions being instructed in the same graceful art.

(To be continued.)

THE BLOOD-SUGAR OF THE COW IN MILK FEVER AND UNDER NORMAL CONDITIONS.

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WIDMARK and Carlens[1] found that by inflating the udders of normal cows and goats, a hypoglycæmia was produced, the intensity of which was most marked in heavily milking animals and vice versa. On inflating the udders of cows suffering from milk fever, they noted a rapid rise in blood sugar which was concurrent with the recovery of the animal. They, therefore, attributed milk fever to a hypoglycæmia caused by the sudden onset of lactation.

The more recent work by Hayden and Fish[2] does not point to a hypoglycæmia as the causative factor, since they were unable to demonstrate any hypoglycæmia in pre-inflation blood samples. Their values for blood sugar were, if anything, rather above normal. In their report they stated that they were unable to show any variation of blood sugar above or below normal as the causative factor in milk fever. They were able to amplify previous work by applying the fermentation test of Folin and Svedburg[3] to differentiate between glucose and lactose, in blood. By this means they have shown that the temporary rise in blood sugar following udder inflation is largely due to lactose reabsorbed from the mammary gland. With one exception they found no lactose in pre-inflation blood samples, and even in that case it was not present to any marked extent. Lactose is a foreign body in the blood and not a normal constituent and is, therefore, excreted in the urine.

Seventeen milk fever cases were recently investigated by us. In five cases we were able to take two samples of the animal's blood.

(*a*) Before udder inflation, when the animal was "down."

(*b*) About six hours or more after inflation, when the animal was well on the road to recovery, but when the temporary rise in blood sugar due to udder inflation had had time to subside. The results obtained seem generally to indicate a slight rise in blood sugar when "down" with the illness as compared with the results obtained after the animal was feeling the benefits of udder inflation, but no case shows any marked variation. The blood sugar was estimated by two different methods, each method being carried out in duplicate on every sample. One of us (S.K.) employed the method of Folin-Wu[4], while another (H.F) used that of Hagedorn-Jensen[5]. The mean values for each sample, obtained by the two methods, are tabulated below. Results are given as percentage glucose.

Case No.	1	2	3*	4	5
Blood Sugar (*a*) pre inflation	·086	·088	·050	·057	·075
(Jensen) (*b*) after recovery	·072	·075	·054	·057	·055
Blood Sugar (*a*) pre inflation	·090	·058	·050	·050	·061
(Folin-Wu) (*b*) after recovery	·077	·050	·050	·060	·040

*Subsequently died.

Two more cases were investigated, using only the Folin-Wu method. In the first case a blood sample was taken at 10.30 a.m., just before inflation, another sample at 4.30 p.m., six hours afterwards, and a final blood sample at 10 a.m. the following morning. The values for the blood sugar of these three samples were ·08, ·07 and ·09 respectively. The second case gave a pre-inflation blood sugar value of ·075 and a blood sample taken six hours afterwards gave ·07. In the remaining ten cases only a single blood sample was taken, which was in each case, prior to udder inflation. The results obtained were :—

Case No.	1	2	3	4	5	6	7	8	9	10
Blood Sugar %...	·105	·07	·07	·05	·067	·065	·075	·095	·074	·08

The blood sugars were estimated either by the Folin-Wu or the Hagedorn-Jensen method, according to the worker to whom the blood samples were sent.

The figures obtained in the above 17 cases of milk fever, seem to support the view of Hayden and Fish, that there is no marked variation in the blood sugar, either above or below normal, in milk fever, and it is probable that the cause of the disease must be sought elsewhere.

The blood sugar of a normal human subject is known to vary approximately between the limits ·08 and ·18 per cent. without passing the "renal threshold.' The normal blood sugar of a cow in

milk has been generally stated to be considerably lower than that of a human being. Widmark and Carlens place it at ·06 per cent., while Hayden and Scholl[6] give it as approximately ·052 per cent.

In view of this, it was thought desirable to obtain data which might throw light on the variations of blood sugar in a normal cow, and, therefore, the following experiment was conducted. Hourly samples of blood were taken from a healthy cow penned in a loose box, for a period of 24 hours, excluding the interval between 9 p.m. and 6 a.m. the following morning. The experiment was commenced at 5 p.m. The blood sugar of each sample was determined in duplicate by the Hagedorn-Jensen method, and the mean of the two readings taken. The cow under investigation was in good condition but confined, owing to the fact that she was expected to calve in four or five days' time. A final blood sample was taken from her at 4.30 p.m. on the day following calving, 17 hours after delivery, and showed no significant variation from the 5 p.m. sample when pregnant.

The results are tabulated below, together with a table of the food given to the cow during the time that she was under observation.

	Hourly Blood Sugar Values from a Normal Cow.		
Sample No.	Time.	Blood Sugar (as per cent. glucose).	Food Taken—General Notes.
1	5 p.m.	·056	
2	6 ,,	·069	7 lb. hay fed at 5.30 p.m.
3	7 ,,	·062	Chewing cud.
4	8 ,,	·073	
5	9 ,,	·066	
6	6 a.m.	·066	Taken before feeding.
7	7 ,,	·076	4 lb. cake given after 6 a.m. test.
8	8 ,,	·090	
9	9 ,,	·090	
10	10 ,,	Clotted	25 lb. silage fed just after 9 a.m. test
11	11 ,,	·076	
12	12 noon	·083	20 lb. mangels fed at 11.30 a.m.
13	1 p.m.	·093	
14	2 ,,	·078	
15	3 ,,	·069	
16	4 ,,	·079	4 lb. cake fed at 3.30 p.m.
	Four days later.		
17	4.30 p.m.	·058	Taken 17 hours after calving, between two meals.

The above table shows a variation for individual samples between ·056 and ·093 per cent., while the mean value for the 15 consecutive tests is ·075 per cent.

A few months later this work was substantiated by blood sugar determinations on two more cows, from whom early morning blood samples were being taken in connection with experiments on oil feeding. The first sample was withdrawn at 5.30 a.m. and the second at 9.30 a.m. Cow No. 1 had blood sugar values of ·095 and ·106 per cent. for the 5.30 and 9.30 samples respectively, while the corresponding values for Cow 2 were ·068 and ·104 per cent.

The above figures would seem to show that the blood-sugar content of normal cows varies between fairly wide limits, and this fact should be taken into consideration before the blood sugar of any isolated sample from a cow, is stated to be above or below normal.

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A SURVEY OF THE DEVELOPMENTS OF RESEARCH INTO BOVINE CONTAGIOUS ABORTION DURING THE PERIOD 1895—1928.

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(*Concluded.*)

Section II.

In 1909 Holth ([10]) confirmed M'Fadyean and Stockman's findings *re* the cultural behaviour of *B. abortus* by growing it under ordinary aerobic conditions after it had been cultured for a few generations in a medium saturated with oxygen. He then studied agglutination and complement fixation, using at first the serum from an immunised horse. He drew attention to the value of these methods of diagnosis in a disease of such long incubation period, and devoid of symptoms during that period.

In 1910 MacNeal and Kerr ([11]) published the first account of the isolation of the causal organism in the U.S.A., and suggested for it the name by which it is now known.

Zwick ([12]) made comparative studies of various strains of the

organism, and established the identity of the disease in various European countries.

Grinstadt [13] at this time carried investigations of the agglutination test a stage further. Agglutinins were demonstrated in the blood of rabbits after they had been infected with live cultures intravenously and intraperitoneally, and dead cultures intravenously.

These results showed that the rabbit was a suitable animal for serological reactions with *B. abortus*, and from this time it became a useful adjunct to the larger animals.

He made observations on cattle, and found that agglutinins persisted in the sera of aborting cows for at least 10 months following the act of abortion. He also found that the sera of cows which had calved normally had only a slight agglutinating power, and that agglutination did not occur in dilutions above 1 in 30.

In these experiments the sera were diluted with water instead of normal saline, and the bacterial emulsion was prepared by adding the centrifuged deposit of a serum culture to physiological salt solution. The suspensions were only incubated for three hours at 37° C.

It was probably not realised at this time that agglutination is an electrolytic phenomenon, and varies in degree in positive reactions, in proportion to the strength of the saline present in the serum-antigen mixtures incubated. The type of culture used could not be considered ideal.

This work, although open to criticism, served to show that the test was of more practical importance than was at first supposed.

In 1911 Brüll [14] followed up the work of Holth, and showed that cows in infected herds which calved at full term were often infected with *B. abortus*. He found that specific agglutinins were sometimes present in the first month of gestation, and also that they persisted for two years after abortion. He put agglutination in a dilution of 1 in 64 as the maximum titre for the non-specific agglutinins in the sera of normal cattle.

In the same year Schroeder and Cotton [15] made a valuable discovery.

During a series of milk inoculations into guinea-pigs they found an organism in certain of the milk samples which produced tubercle-like lesions in the spleen, liver and kidneys. They did not identify it, and it was at first erroneously considered to be Gram positive, but a little later Mohler [16] demonstrated conclusively that these workers had been dealing with *B. abortus*.

This work was of far-reaching importance, as it showed that localisation of the organism was not confined to the uterus of infected animals, as had been supposed up to this time. As the lesions obtained

in the infected guinea-pigs, particularly those of the spleen, conformed very closely to type, these animals were shown to be valuable for biological tests, applied in the same way as those for tuberculosis, although full use was not made of this discovery until some years later.

In 1912 M'Fadyean and Stockman ([16]) reported the results accruing from further investigations of the agglutination test. By a long series of experiments, embracing nearly 700 animals, they brought the test definitely beyond the probationary stage, and considered that it might be used for diagnosis in the field. A definite technique was adopted. The organisms were freshly grown on serum-agar and suspended in 0·8 per cent. salt solution containing 0·5 per cent. carbolic acid. The suspension was diluted until, in the small tubes used in the tests, it was " faintly hazy in appearance." Minor variations in density were not considered to affect the results. Incubation of the serum-antigen suspensions was for a period of 24 hours.

With the density of suspension described, it was possible to get water-clear agglutinations with a known positive serum. Positive and negative sera were used for control purposes.

The dilutions of suspected serum used were in most cases 1 in 50, 1 in 100, 1 in 200, 1 in 400, 1 in 500, 1 in 600, 1 in 800, and 1 in 1,000.

The sera of 535 *presumably* healthy cattle, mainly steers, were tested, in order to throw more light on the limit of agglutinating power possessed by non-infected animals. In certain cases additional dilutions were made of 1 in 10, 1 in 20, and 1 in 40, so as to cover the maxima in animals whose sera had a low agglutinin content.

Sera from 526 of the animals failed to show any distinct agglutination at 1 in 50. Nine showed " some agglutination " at that dilution. One steer showed complete agglutination at 1 in 200, and later on at 1 in 500. The serum of a calf showed partial agglutination at 1 in 200, but it was not complete at 1 in 50. The sera of two bulls agglutinated completely at 1 in 50.

" In the great majority of these cases the blood was taken while the animals were being killed at a slaughter-house, and naturally in such cases their past history was not obtainable."

The results obtained therefore could not be regarded as allowing a definite and final opinion to be formed on the degree of non-specific agglutinins present in the sera of cattle *known* to be free from any history of abortion. At the same time they provided a reasonable average on which to base the results obtained with the sera of animals suspected of being infected.

The authors themselves inclined to the view that the steer whose

serum showed complete agglutination at 1 in 200, and later at 1 in 500, had actually at some time been infected with the bacillus of abortion.

In the case of one of the animals which was known to be infected, distinct agglutination at 1 in 100 was shown two years after abortion, a similar occurrence to that recorded by Brüll the year before.

Out of a total of 127 animals which had actually aborted, or which came from infected herds, diagnostic agglutination was given in 62 cases.

These experiments allowed them to consider that water-clear agglutination at 1 in 50 was strong evidence of infection. It was also found that recent aborters occasionally failed to give a diagnostic reaction immediately after abortion, although complete agglutination at 1 in 100 or higher was recorded in them a few weeks later.

An animal whose serum gave a high titre was regarded as having been infected for a lengthy period.

The discoveries of Schroeder and Cotton already recounted, bore fruit in 1913, when Zwick and Krage ([17]) demonstrated culturally the presence of *B. abortus* in the milk of a cow which had aborted 14 days before the sample was taken. The milk was centrifuged and the sediment looped on to agar slopes, and the impure cultures obtained were purified by subcultivation.

The organism was also isolated from the milk of animals which had aborted six and 13 months before.

Half of the udder of each of two goats was infected with agar cultures of *B. abortus* emulsified in 2 c.c.'s of salt solution. The organism was recovered from the milk of the infected halves of the udders during a period of from three to five months, and for many weeks the number of the bacteria present appeared to be unvarying. The milk remained unaltered in appearance.

Serum from two goats showed agglutination at 1 in 800 in one case, and 1 in 400 in the other. Abortion bacilli were excreted in the milk of two goats inoculated subcutaneously and intravenously with 10 c.c.'s of a saline bacterial suspension, at so short a time as 24 hours after the inoculations, and they were still found after a period of eight weeks.

In 1913 M'Fadyean, Sheather and Minett ([18]), working on artificially infected cattle, compared the agglutination and complement fixation tests, and found that the results were "broadly concordant."

This was a very valuable conclusion to reach, as from this time the highly technical complement fixation test could be relegated to second place, as a confirmatory test of value, and the agglutination test became recognised as a reliable one for routine use.

XUM

Both tests gave positive reactions from 7 to 21 days after infection, but these results could hardly be considered as throwing much light on the period when diagnosis would be possible by these means in natural cases of infection, as antibody formation is probably much slower in such cases.

Male animals, bulls or steers were satisfactorily infected by way of the prepuce, and the series of infection experiments made, enabled these workers to reach the important conclusion that cattle of any age and sex could be infected by natural channels.

In 1914 Stockman ([19]), in a published report dealt with recent researches, and his own work on immunisation.

He was satisfied that abortion bacilli might be excreted for long periods in the milk of infected cows. He therefore regarded cows which had aborted as possible carriers and disseminators of infection.

As will have been noted, research into the disease had up to this time very largely centred round the problem of diagnosis, a subject admittedly of prime importance, and immunisation, although investigated earlier by Bang, had not received the attention it merited. The work therefore, was of great importance.

Investigation was made into methods of immunisation, first with liquid cultures, employing a dose of 125 c.c.'s, and later with cultures grown on solid agar-potato medium, and washed off with saline. By the latter method the dose was reduced to 30 c.c.'s.

Two kinds of vaccine were prepared at the Ministry of Agriculture's Veterinary Laboratory at this time.

(1) Anti-abortion " A," consisting of living bacilli.

(2) Anti-abortion " B," consisting of bacilli killed by exposure to a temperature of 65° C. for half an hour.

Only non-pregnant animals were given the live vaccine.

Some thousands of field inoculations of infected herds were made, and the experiments were controlled by leaving some of the animals unimmunised, in the herds dealt with.

Very little benefit was observed by using vaccine " B," and its use was soon discontinued.

The records of one group of animals vaccinated with the live vaccine give a fair picture of the average results obtained.

Of 201 animals immunised, 4·9 per cent. aborted.

Of 243 animals unimmunised, 20·1 per cent. aborted.

Of the 201 animals, 65 were heifers, and of these 6·1 per cent. aborted.

Of the 243 animals, 47 were heifers, and of these 14·8 per cent. aborted.

XUM

In seven herds immunised during 1913-14, totalling 397 animals, the percentage of abortions did not exceed five.

These results indicated that vaccination was a practical method of dealing with the disease in herds in which the extent of infection was serious, but it was realised that as the vaccine was a live one, much discretion was needed in its use.

Bevan ([20]) at about this time showed that the sera of heifers inoculated with massive doses of the dead organism reacted to the agglutination test at as high a dilution as 1 in 250, up to the fifty-fifth day following inoculation. As the dead vaccine had not produced satisfactory results, these observations suggested that immunity did not in any great measure depend on agglutinin formation.

The nature of the immunity conferred by the live vaccine was by no means understood, and any opinions expressed at this time were largely conjectural.

The "abortin" experiments reported by M'Fadyean and Stockman in 1909, were followed in 1914 by a report by Meyer and Hardenbergh ([21]) of tests of a "precipitated purified abortin" prepared by themselves.

It was claimed to be an improvement on the English preparation, as it was composed of only the precipitable substances.

They made a comparison of the two preparations, and found that the results with their own were more specific, particularly when used intravenously. They obtained a conclusive diagnosis in 59·3 per cent. of the cases of infection, the tests being controlled by serological reactions.

This attempt to increase the specificity of the reaction method did not bring the results up to a level which would have justified its general adoption, and the investigation of temperature reactions was not pursued further after this date.

In 1915 Seddon ([22]) published some valuable observations on the agglutination test. He found that the inherent unsuitability of milk for agglutination purposes could be overcome by clotting it, and using the whey. He added to 9 c.c.'s of milk 1 c.c. of a 10 per cent. aqueous solution of lactic acid. The coagulated milk was then filtered through filter-paper. The whey was then diluted with carbol-saline to a basal dilution of 1 in 10, and incubated overnight, and filtered again in order to remove albuminous deposit.

He found that the agglutinins in whey increased and decreased in much the same manner as they do in blood serum.

In these experiments he used a suspension of *B. abortus* standardised by comparison with a suspension of barium sulphate. The latter was prepared by making up a 1 per cent. solution of barium chloride in distilled water, and a 1 per cent. solution of sulphuric acid. Thirty-

three c.c.'s of the barium solution was then added to 97 c.c.'s of the acid solution, shaken, and allowed to come to a state of chemical equilibrium.

Seddon showed that using the same quantity of emulsion in each tube, tubes possessing the same dilution (but different quantities) of the same serum, did not furnish parallel results, but that using the same quantity of emulsion in each tube, tubes containing the same quantity of serum *did* furnish parallel results.

In other words the amount of neat serum present in the bacterial emulsion, whether that serum was or was not added in a diluted form, was found to be the factor of prime importance.

The necessity for using a standardised method of procedure, if accurate and comparable results were to be obtained, was clearly shown by these observations. Although they did not lead to a general agreement as to methods, to the detriment of comparative studies, they did no doubt draw the attention of other workers to the advisability of exercising greater care in their technique.

In 1916 Cooledge ([23]) studied the susceptibility of the human subject to *B. abortus*. By feeding infected milk, he demonstrated the presence in human blood of *B. abortus* antibodies up to four weeks after ingestion. He concluded that this was due to a passive immunity caused by the absorption in the large intestine of the antibodies present in the milk.

He formed the opinion that the organism was not pathogenic to man.

In the same year Schroeder and Cotton ([24]) published the results of further researches.

They isolated *B. abortus* from two or more quarters of the udders of naturally infected cows. Following this, they succeeded in infecting the udder of a four-year-old virgin heifer, by injecting abortion bacilli into one of the jugular veins.

After an extensive series of *post-mortems* of naturally infected cows, they were unable by either culture or animal inoculation to find infection in parts of the body other than the udder and one or more supramammary glands, with the exception of one case in which some of the pelvic lymph glands were infected.

They considered that the udders of cows were a common habitat of the bacilli, and that they were not present at any other site in infected non-pregnant cows.

Brüll had shown by agglutination tests, in 1911, that infected cows frequently calved normally, and now Schroeder and Cotton noted normal calving in animals which not only had infected udders, but also had bacilli present in their uterine discharge and afterbirth.

XUM

They experimentally demonstrated the passage of infection from the udder to the uterus, and considered that the spread of infection from cow to cow might sometimes be caused by the transmission of udder infection by the hands of milkers.

They noted the high agglutinating power of colostrum from cows with infected udders, followed by the rapid decline of that power when milk took its place.

The sera of two bulls agglutinated the organism at dilutions of 1 in 200 in one case, and 1 in 100 in the other. An abscess infected with *B. abortus* was found in the epididymis of the testicle of one of the bulls, and the organism was found in the seminal fluid of the other (recovered from a cow's uterus), on guinea-pig inoculation.

This discovery of the organism in the system of the bull rendered the male suspect as a possible true carrier of infection, but no cases were met with which could be considered to confirm the suspicion.

As a result of these researches, Schroeder and Cotton inclined to the view that *B. abortus* had a peculiar affinity for embryonic tissue.

At this period Reichel and Harkins ([25]) investigated the possibilities of an intradermal reaction as a fresh means of diagnosing the disease.

They prepared an " intradermal abortin " in the following manner.

Six to eight strains of *B. abortus* were grown in Blake bottles on neutral glycerine-agar, by incubation at 37° C. The growths were removed with sterile physiological salt solution, and collected as one mixture, which was heated for one hour at 60° C., and then centrifuged and washed. After washing the killed bacilli once more with salt solution, the suspension was shaken up mechanically in a definite amount of saline and filtered through four thicknesses of sterile cheese cloth, and then diluted so that each c.c. contained approximately five billion organisms. The suspension was then cultured for sterility and preserved with 0·5 per cent. phenol.

They injected 0·1 c.c. of this solution into the skin over one of the caudal ligaments, after wiping the area with disinfectant.

They recorded results after 48 hours, and regarded any increase in the swelling over the swelling (if any) caused by the direct injection of the abortin, as a positive reaction.

In some animals distinct swellings from 0·5 × 1 cm., to 5 × 6 c.m. occurred. Some of the larger reactions persisted for as long as 10 days.

As compared with the positive serological reactions, only a few animals reacted to the intradermal test, although no animal with a negative history and negative to these control tests, gave evidence of any reaction, which was proof of the specificity of the positive results recorded.

XUM

Reichel and Harkins considered that their intradermal abortin was more specific than the abortin used by M'Fadyean and Stockman, or the precipitated purified abortin prepared by Meyer and Hardenbergh, from the very nature of the products.

It is possible that the technique used in preparing the intradermal abortin, in which the bacilli after heating, centrifuging, and removal of the supernatant fluid, were subjected to further washing, removed some of the antigenic properties of the final product, and this may in some measure account for the small number of reactions recorded. No information was given regarding the agglutinability of the various strains of organism used.

On the results obtained the test could not be relied on to detect individual reactors, but Reichel and Harkins considered that it was of use in the field for determining whether or no a herd was infected.

This work was a valuable addition to that already done on reaction methods, as it was the first recorded attempt to diagnose the disease by means of a local reaction.

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OBSERVATIONS ON CALCIUM DEFICIENCY AS A CAUSE OF CERTAIN DISEASES OF ANIMALS AND MAN.*

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(*Continued.*)

Field Experiments on Lamziekte.

Still more interesting is a set of field experiments carried out on a *lamziekte* area. Whereas all the test animals used in the experi-

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ments described above appear to have been drawn from healthy areas, in these field experiments it was desired to secure cases of *lamziekte*, and therefore the cattle used were drawn chiefly from areas in which *lamziekte* had occurred, and were placed in camps on a farm called Armoedsvlakte, specially selected for its reputation as a very bad *lamziekte* area. The cattle were allowed to graze over *lamziekte* veld, and various foodstuffs were supplied as supplementary rations to see if the natural occurrence of the disease could be thereby prevented. At the same time, control animals without supplementary rations were employed, and to one lot a rice supplement was given to see what the effect might be. To facilitate a full calorie intake, treacle and linseed oil were used. To supply the "antineuritic" vitamin and improve general condition, bran, beans, maize, and potatoes were severally tried, also a mixture of bran and bean meal with molasses. With the object of testing the value of yeast, a quantity of this material was regularly administered to one lot.

The solution of these disease problems is of such enormous economic importance, apart from scientific values, that I am sure I shall be forgiven for spending a little time over the details. The animals were divided into lots of ten, yarded at night, fed with the supplementary rations in the early morning, and turned out to graze for the rest of the day. The "orypan" mentioned in the treatment was a commercial preparation of rice polishings, proved in preliminary experiments to be very effectual in preventing and curing polyneuritis in pigeons—the polyneuritis of the variety caused by feeding on polished rice. I give here a *résumé* of the outcome of the experiments.

Treacle, Lot C, 10 cattle. Daily ration of two and a half pounds per head, smeared upon hay and fed in troughs. Commenced December 18, 1913, discontinued August, 1914.

On April 8, about four months after commencement, cattle 2976 and 2996 were noticed sick. Number 2976 died April 9, and 2996 on April 13, both of *lamziekte*. On May 16, animal 2989 sickened. It was treated with 100 grammes of orypan, but showed no improvement, dying 4 days later of acute *lamziekte*. On May 20, animal 2623, which had replaced 2996, developed an attack. Ten days later, when on the verge of death, it was put out of misery, and the diagnosis was confirmed. On May 30, the quantity of treacle fed was doubled, but no further cases happened to occur up to the date of discontinuance.

Linseed Oil, Lot D, 10 cattle. The daily ration of half a pound per head was also fed smeared on hay. Commenced January 6, 1914, discontinued August 10, 1914.

On February 7, animal 2343 sickened, and died two days later. On March 8, 2614 developed acute *lamziekte*, dying the following day. On May 30 the quantity of oil was doubled, but no further cases occurred until June 11, when a mild evanescent attack was diagnosed in animal 2353.

Beans, Lot E, 10 cattle. Daily ration of two and a half pounds, fed as

soaked whole beans at first, later as coarsely ground meal. Commenced December 18, 1813, discontinued August 10, 1914. On February 11, 2840 was diagnosed as suffering from a slight attack of *lamziekte*, but it recovered a little later. On May 30, however, it developed an acute attack and died in two days. Animal 2843 sickened on May 5, but recovered. On May 30, the daily ration was raised to the very liberal allowance of four pounds per head per day, but nevertheless number 2843 developed a second attack on June 28, of which it died on the thirtieth. Incipent affliction was diagnosed in number 2993 on May 18. Three days later, acute *lamziekte* set in with rapid death. Animal 3170 died of *lamziekte* on June 13, fourteen days after the bean meal supplement had been raised from two and a half pounds to four pounds.

Bran, Lot G, 10 cattle. Daily ration of two and a half pounds per head, raised to eight pounds on May 28, generally given dry. Commenced December 18, 1913, and discontinued August 10, 1914.

The first case occurred on January 5, on which day heifer 2139 went down, death ensuing the day after. On March 13, animal 2145 showed signs of *lamziekte* and was treated with orypan. It recovered, but the recovery is believed to have been spontaneous. In May, three more cases occurred. Number 3166, which had passed through a slight attack in February, succumbed to an acute attack on the twenty-ninth, and died within twenty-four hours. On the nineteenth, animal 2998 developed acute *lamziekte*, dying on the day following. On the thirtieth, number 2999 was suspected, but it recovered within a few days, leaving the diagnosis doubtful.

Mixed Ration, Lot F, 10 cattle. Commenced January 6, 1914, discontinued August 10.

During the first month, the total supplementary ration for all the animals consisted of twenty-five pounds bran, nine pounds bean meal, six pounds treacle; or four pounds of the mixture per head per day. Thereafter the bran was reduced to ten pounds until the end of May, at which time the whole ration was raised to twenty pounds bran, twenty pounds bean meal, and five pounds of treacle. Animals 2974 died of *lamziekte* on February 7. On May 13, two cases occurred, both terminating fatally within two days, number 2352 dying on the fourteenth, and number 2987 on the fifteenth. In the former case, treatment with orypan was carried out, but with no effect. About May 20, animal 3145 sickened, but recovered spontaneously.

Crushed Maize, 10 cattle. From June 13 to August 10, 1914. Daily ration of three pounds per head allowed. This test, it will be noticed, was begun late. Within the experimental period of two months, only one case occurred, animal 3192 dying of acute *lamziekte* on July 26, after having eaten one hundred and thirty pounds of maize in the forty-three days of survival.

Potatoes, 10 cattle. From March 19 to August 10, 1914. The daily ration of fourteen pounds per head was roughly crushed immediately before feeding. On May 1, animal 2962 was diagnosed as a doubtful case, but the attack passed off. On May 12, animal 2383 succumbed to peracute *lamziekte*. On May 31, animal 2512 developed a slight attack but recovered. On August 5, number 2962 contracted an acute attack and died the following day.

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Yeast, 10 cattle. The pressed brewers' yeast was diluted with water, boiled for a few minutes, allowed to cool, and administered. The experiment was started on March 29, but owing to a slip in the schedule the daily quantity of yeast given at first was a quarter of an ounce instead of a quarter of a pound. This, however, was rectified after the lapse of three weeks, and five ounces per head were given each alternate day from April 21 to May 25, after which five ounces were given every day. Animals 2488 and 2603 developed acute *lamziekte* on May 1, dying within two days. On May 18, number 2349 was diagnosed as suffering from *lamziekte*, and on May 21 it died. On May 23, animal 2615 died after two days' illness. Number 2338, put in on May 26, to replace 2615, succumbed to peracute *lamziekte* on June 14.

Rice,—Five cattle were started on five pounds of rice per head per day on January 6. On May 16, five more cattle were added, and on May 30 the daily ration for all animals was increased to ten pounds of rice per head. The rice was given soaked. Animal 3137 contracted *lamziekte* on March 20, and died on the twenty-sixth. On May 19, number 3141, of the second batch, after only three days of rice, was noticed somewhat stiff in gait, but this rapidly passed off again, and was not diagnosed at *lamziekte*. Animal 2367 died of *lamziekte* on June 24. Cow 3134 calved on May 26, developed a severe attack on June 28, and was killed on July 3. Animal 2965 also died of *lamziekte* on July 3, after a few days' illness. A fifth case (2441), which died two days after being put into experiment, and was replaced by a fresh animal, is excluded from consideration, as in the initial stages of disease at the time of commencing. The remaining six cattle were not affected up to August 10, the date of discontinuance. The digestive troubles so prevalent amongst the laboratory cattle were evidently prevented by the *ad libitum* grazing in the field.

Controls, Lot A. From January 22 to August 10, 1914. Fourteen cattle grazing night and day in the same camp made up the controls. Four cases occurred. Number 3148 went down on May 13, dying on the fourteenth, in spite of orypan treatment. Animal 2328 was diagnosed as suffering from *lamziekte* on May 21, and died on the twenty-fourth. Number 3151 developed an attack on June 3, was treated with orypan on the fourth, but died shortly after. Animal 2323 succumbed to acute *lamziekte* on June 13. A fifteenth animal brought up from Kaffraria on May 5, developed *lamziekte* on June 11. The district from which the animal was drawn is also a reputed *lamziekte* area.

Comment on the Lamziekte Experiments.

We see that in these Armoedsvlakte field experiments the animals in most groups received a quantity of " antineuritic " (or *B*) vitamin which should have been an ample protection against the beri beri form of polyneuritis. The particular stock of bran used had been previously tested on pigeons, and had been found to possess an extraordinarily high antineuritic value for those birds. The bean meal had been found highly protective. The protective value of yeast is well known. Yet the presence of a really considerable quantity of these materials in the food had no protective influence at all in regard to the development of *lamziekte*, and orypan, a preparation

derived from rice polishings, previously tested on pigeons and found curative, was found quite ineffectual when administered as a remedy in cases of *lamziekte*.

Since it has been found that osteoporotic changes and defects of ossification occur in cases of scurvy, and that Hutcheon, at least, has connected osteoporosis with *lamziekte*, it becomes necessary to inquire whether a deficiency of the antiscorbutic vitamin might not be concerned in the pathogenesis of *lamziekte*. We seem to find this question answered in the negative in the experiments just considered, for it appeared that a liberal supply of crushed raw potatoes did not prevent the disease. In the supplementary rations consumed there was certainly a deficiency of calcium phosphate. If the animals obtained their requirements of calcium phosphate, they must have obtained them from the pasturage on the *lamziekte* farm.

We may turn aside here for a little view of the Armoedsvlakte pasturage as presented in a discussion of the cause of bone-eating by Sir Arnold Theiler in a later paper.[19] Theiler regarded bone-eating as entirely distinct from *lamziekte* in its pathogenesis, and as due to a deficiency of phosphorus in the food. He found that animals with a mild craving declined to touch putrid bones, although they exhibited a craving for bones if they were not putrid. But those with the severest craving would devour them eagerly when rotten. Practically every animal on the farm would chew a perfectly bleached sweet bone. He therefore classified them as follows: Those which ate bones even when putrid were "marked cravers"; those which sought for fresh bone only were designated "mild cravers." The remainder, although they would eat sweet bone-meal if offered, were entered up as "non-cravers." All the cattle at Armoedsvlakte were tested once a week in this way, which permitted the plotting of a curve of seasonal variation. The recording started from May, 1919, when 40 per cent. of all grazing animals tested showed craving. There was then a gradual increase until August 5 (winter), when the maximum craving was reached, and 80 per cent. of all the cattle ate rotten bones. From that date onwards a gradual descent in the curve was noted, until October 27, by which time the craving had again fallen to 40 per cent. During this period the weather had been continuously dry, but as it grew warmer the spring vegetation began to appear, and this was regarded as responsible for the diminution. During the ensuing fortnight rain fell, the young vegetation became almost luxuriant, and by the middle of November the craving had rapidly fallen to 6 per cent. of all the animals tested—had vanished except for the more or less chronic cravers. This minimum craving was maintained through a fortnight of rainless weather, and then, as

the young grass wilted, craving rapidly returned, reaching a maximum of 82 per cent. within three weeks. For the next two months of drought it oscillated around this figure. The craving curve up to that date, therefore, showed pronounced craving while the cattle were grazing upon the old grass of the preceding rainy season, reduced craving as the young spring vegetation began to shoot, practically no craving after the beneficial effect of the rains upon the young grass, but a recrudescence of craving during the ensuing drought when the young grass wilted and shrivelled up,—a craving which remained high so long as the drought continued. In the middle of January, 1920, the drought broke, the pasture rapidly recovered, and it was naturally thought that the craving would again disappear. The unexpected happened, however, and notwithstanding the ample supply of good green grass, and the absence of wilting, the craving did not fall to the previous 6 per cent., but only to 50 per cent. As the age of the grass advanced towards maturity, the craving curve again rose, and by the end of March once more stood at 80 per cent.

During the period of initial high craving, hay cut from the grazing areas showed the very small proportion of 0·08 per cent. phosphoric oxide. During the period of rapid growth after the rains, the young grass showed 0·56 per cent. of phosphoric oxide, or seven times as much. During the period of lowest craving, the phosphorus content remained fairly high, and as the craving rose again the percentage of phosphorus in the grass steadily fell. By January 15 it was down to 0·18 per cent. phosphoric oxide.

The figures for calcium oxide were not given. I may say here that the two low figures for phosphoric oxide in the Armoedsvlakte grass are both considerably lower than those found in any analysis of the grasses from osteomalacia areas in New South Wales,[20] calculated to dry matter. Bone-chewing was associated with the osteomalacia in these New South Wales areas.

After this long, but necessary, interruption, let us once more return to the Armoedsvlakte field experiments. It will have been observed that the controls also contracted the disease. The cause would therefore seem to be traceable to something outside the supplementary rations, and resident on the farm. There is the possibility that the animals in the various groups had eaten of some poisonous substance able to cause *lamziekte*. As a matter of fact, that is the way Theiler now explains *lamziekte*.[21] According to his most recent theory, the cattle develop pica as a result of phosphorus deficiency in the pasturage, the perverted appetite then causes them to eat carrion, and in the carrion are certain bacteria which manufacture a poison capable of causing a paralysis which is in fact

lamziekte. Not all putrid carcasses can cause this, but the specific bacteria only occur in carcasses in certain regions, which mark the regional distribution of *lamziekte*. Theiler is so sure of his theory that he states it as a complete and final settlement of the question. However, in scientific work no conclusion can be regarded as more than provisional,—and I am wholly sceptical. It may be remarked that, *mutatis mutandis*, Theiler's theory is in all essential respects the same as Lombroso's theory of fifty years ago on the causation of pellagra. The hypothetical cause of pellagra, according to that view, was that it is due to a toxic chemical substance derived from maize affected by some mycotic growth. For many years it was heresy not to believe Lombroso's theory. It is now dead.

We may admit Theiler's claim that he had produced paralytic conditions in animals by subcutaneous injection of toxic material obtained by filtering putrefactive saprophytes, and also by oral administration of the organisms. But at the same time we may remain unconvinced as to the identity of that paralysis with *lamziekte* paralysis. If cows are specially liable (as they are said to be) to go down with *lamziekte* eight to fourteen days after calving, they appear to time their consumption of the toxogenic saprophyte in a very extraordinary way to a period about a week after calving. Why?

A New Explanation of Lamziekte.

I believe I can propose a reasonable explanation of *lamziekte*, and of a whole class of related morbid phenomena in animals, and it seems best to state it here in a categorical form, so as to make it more clear.

Hitherto it has been tacitly accepted by the great majority that polyneuritis, or cognate disturbance of the nervous system, when an indication of nutritional deficiency, belongs exclusively to deficiency of vitamin *B*, the so-called " antineuritic " vitamin. But if I am right, that is not so. It can occur as a result of deficiency of vitamin *D*. It can occur through deficiency of calcium and/or phosphorus in the dietary. There is evidence that it can come from other deficiencies, such as that which is responsible for pellagra. But I am not dealing with pellagra here. It may occur from the deficiency which seems to be responsible for at least some cases of pernicious anæmia. But I am not concerned with anæmia just now.

There is evidence suggesting very strongly that in cases where there is deficiency of vitamin *D*, meaning by " deficiency " a failure to reach the physiological optimum, the intestinal absorption of ingested calcium phosphate is rendered relatively incomplete. Some of this evidence we have seen in Hart and Steenbock's balance experi-

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ments on the metabolism of a goat,[22] but much more could be cited, did space allow. In some cases there may be combined with defective absorption an increased calcium loss. How far the gastro-intestinal catarrh that is so frequently observed at autopsy may be responsible for defective absorption I cannot say, but it is not likely to be the whole cause, for catarrh and erosions appear to be common in every description of deficiency disease. An increased desquamation of epithelium would also pretty certainly increase calcium loss, and if diarrhœa were present, the desquamation would be very considerable. During lactation there is a natural physiological drain of calcium and phosphorus depending on the quantity of milk secreted, and therefore much greater in cows bred for a high milk yield. One may add another remark, that owing to catarrhal gastritis of the fourth stomach there may be lessened secretion of hydrochloric acid, and consequently some difficulty in the solution and digestion of calcium phosphate.

Since reference has been made to possible derangements of absorption or excretion in other kinds of dietary deficiency, we may just note here, but without pushing the analogy, or suggesting explanations that might be quite wrong, the well-established fact that an osteoporotic condition of the bones, together with growth changes at the epiphyseal line, occurs in guinea-pigs suffering from scurvy. Furthermore, it has been reported by Shipley, McCollum, and Simmonds[23] that an osteoporotic condition like that of scurvy occurs in the bones of rats suffering from polyneuritis induced by deprivation of vitamin *B*.

Returning now to vitamin *D*, it may reasonably be conjectured that the more severe the deficiency of this vitamin, the more inefficient becomes the intestinal absorption of calcium phosphate. When, notwithstanding some moderate deficiency in the vitamin, the dietary is such that calcium is very abundant in the dietary, its abundance may be great enough to prevent serious nutritional shortage, or to delay the appearance of signs of trouble. If, however, the dietary be very low in calcium, then the supply of mineral material derived from intestinal digestion would fall below the minimal requirement. Again, we may conjecture with much probability that a wrong ratio between calcium and phosphorus might cause a deficiency of both if one of them is too low. This would be through the operation of Liebig's " Law of the Minimum." If both are abundant, it seems that a wrong ratio would not matter unless some digestive incompetency brought one of these elements below the threshold of sufficiency. In more extreme cases of the mineral deficiency, there would be a failure to obtain a sufficient supply even if the assimilative powers were good. Here, I might say, comes in the great protective usefulness

of the symptom called " voracity," " polyphagia," or " bulimia," the last being what it is called in human medicine. It occurs in cases of calcium deficiency, but not in deficiency of vitamin *B*, since in cases of deficiency of vitamin *B*, the more food is taken, the quicker and the worse the catastrophe. In deficiency of vitamin *B*, therefore, anorexia is protective. This feature of the symptomatology is one of the ways in which the polyneuritis of calcium deficiency should be distinguishable from that of the beriberi variety, though it is possible that both deficiencies may be combined. Pica is another protective craving about which much could be written ; " licking disease " and bone chewing (osteophagia) in cattle are forms of pica. Coprophagia (eating of fæces) is similarly derived from a protective physiological instinct.

Returning from this diversion, it may be pointed out now that when there is a shortage of calcium (or phosphorus) supply from the digestive canal, so that the outgoings cannot be met, the body must draw on the mineral reserve in the bones. The bones, therefore, form what may be described as a bank.

Touching my conjecture that a wrong ratio between calcium and phosphorus might bring into action the law of the minimum, I am quite well aware that the metabolism of calcium and phosphorus within the body is largely independent. But the demand ratio, nevertheless, is broadly parallel to the ratio in which the two elements are stored. This is well shown by the experimental work of E. B. Forbes and his associates,[24] [25] [26] [27] though limitations of space make it impossible to do more than mention it here. But as though providing for contingencies, we may note that calcium is present in the bones both as phosphate and as carbonate (the latter, however, in relatively small quantity), and we may expect that either reserve could be used as occasion may arise.

Picturing the bone matter as a bank, we may regard the building up (osteoblast) and breaking down (osteoclast) cells as members of the staff, the former on the receiving side, the latter on the paying-out side. The working of the bank might be adversely influenced by inefficiency of the regulating mechanism. In the present paper it is not possible to discuss at length what that regulating mechanism is, but it is certain that the parathyroid glands enter into it, and it appears no less certain that vitamin *D* is some part of it.

The calcium bank might fail through exhaustion of all its reserves. This is too unlikely to consider seriously. More likely would be a failure through exhaustion of the more easily available part of the reserve during a run on the bank. Or, again, a run on the bank overwhelming the present capacity of the staff—the osteoclasts—to

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handle it, might be imagined as a cause of failure. If be can legitimately draw such a picture, we can imagine a sudden run and a failure to meet it as a "surprise effect." We can picture the milk flow in a newly-calved heavy-milking cow as a sudden run on the calcium or calcium phosphate bank.

When the bank fails, there follows a shortage in the currency; there is a failure of the supply required for the needs of the tissue cells of important organs, and the animal is near to, or over, the threshold of a breakdown. In cases of minor deficiency, there might be merely minor symptoms.

(For References see last issue, pages 243-244.)

(To be continued.)

THE RISKS OF IMPORTING FOOT-AND-MOUTH DISEASE WITH HIDES AND VACCINES.*

By E. MORGAN, F.R.C.V.S., D.V.H.,
Venezuela.

I WOULD advise anyone who is interested in the study of foot-and-mouth disease to seek in countries other than Venezuela in order to find this subject for study, for during the last 14 years, which I have spent in this country as Government Veterinary Surgeon, I have not seen or suspected a single case of this disease. The greater part of this period has been passed in the Frigorifico at Puerto Cabello, where, as Meat and Cattle Inspector, I had every facility afforded for tracing any diseases of animals from all the most important cattle states of the Republic, because no cattle, swine, etc., were allowed to enter the yards of the Meat Works at Puerto Cabello unless they had previously undergone a minute veterinary inspection. In this way we had an opportunity of thoroughly examining the animals both before and after slaughtering.

It will, therefore, be apparent that there has been quite an efficient system of veterinary inspection at the Meat Works of Puerto Cabello, where the only Frigorifico of Venezuela existed. Apart from these *ante-* and *post-mortem* examinations, I was encouraged by the Union Cold Storage Co. to embrace the opportunity, should the Meat Works be closed even for so short a period as two days, of visiting the cattle camp in order to examine the stock and to avoid as far as possible despatching anything but perfectly sound and healthy animals to the Frigorifico.

* These notes have been written in answer to some queries of the British Ministry of Agriculture.

During the periods when the Frigorifico was not functioning, as for example during the last two or three years, all my time has been occupied in supervising cattle throughout the most important cattle areas in Venezuela, and although this necessitated my going into distant parts of the country, yet in all my travels throughout the Republic I have never met a case of foot-and-mouth disease.

During a conversation with Professor J. T. Share-Jones, Director of Veterinary Education at the Liverpool University, some years ago, he asked me particulars of the system we had of examining cattle previous to slaughtering at the Frigorifico in Venezuela. His approval of our system can be seen in a report of a paper which he read to the Sanitary Congress at Bournemouth in 1922, when he emphasised the importance of having this *ante-mortem* examination carried out, and mentioned in particular the system we had at the Frigorifico in Venezuela, that it was far ahead of that which existed in Great Britain in order to trace diseases of animals.

About five years ago I wrote to one or two of the investigators selected by the British Government when there was a serious outbreak of this disease in England, the source of which they were unable to trace, mentioning the possibility of importing the disease into Great Britain from foreign countries, especially South America, by means of hides and skins, knowing that Great Britain had no rigid measures against the importation of hides such as those which exist in the U.S.A., and also knowing that the disease was so prevalent in countries such as the Argentine where huge quantities of meat and hides are exported to Great Britain. Although my suggestion did not receive the attention which I should have wished, yet I still contend that this may be a probable source whereby the disease is conveyed to England from abroad.

Seeing that it is possible for the virus of foot-and-mouth disease in meat to withstand even the chilling and freezing process, therefore, it seems most probable that hides, which do not undergo any process such as chilling or freezing, stand a far more likely chance of conveying the disease. Many suggestions such as these have been ignored in the past, until Professor A. Gofton recently proved beyond dispute to the world at large that foot-and-mouth disease could be introduced into Great Britain from foreign countries by means of meat and its products.

In some of the hilly districts of Venezuela, particularly the estates of Falcon and Lara, I think I am not exaggerating in saying that millions of goats are slaughtered annually, the majority of the skins of which are exported to foreign countries, chiefly to the U.S.A. During my visits to these regions I have never met with a case of foot-

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and-mouth disease; but I would like to point out the fact that my visits to these districts were solely on account of the regulations of the U.S.A., which required a certificate from G.V.S. to the effect that anthrax was not prevalent, and that foot-and-mouth disease, rinderpest, and contagious pleuro-pneumonia, did not exist, in the districts from which these skins were shipped. As far as Great Britain was concerned, there was no such inquiry, which seems that they were taking it for granted that foot-and-mouth disease did not exist here.

It is interesting to note that during three outbreaks in the U.S.A., viz. 1902, 1908 and 1915, two originated near farms where calves were kept for the purpose of cultivating small-pox vaccine. Dr. Mohler, of the Bureau of Animal Industry, succeeded in getting samples of the imported small-pox vaccine which had been used by the vaccine laboratories on the calves which carried foot-and-mouth disease from the laboratories to the farms where the calves were sent. He tested the vaccine on susceptible calves and sheep with the result that typical cases of foot-and-mouth disease were produced. The vaccine had been imported by a Philadelphia firm from Japan. The other outbreak of August 8th, 1915, appeared amongst a herd of swine in Illinois and about the same time a diseased herd of swine was found in Indiana and another in Minnesota. The infection spread from swine to other susceptible animals. On investigation it was ascertained that these outbreaks were due to infected hog cholera serum produced at a Chicago establishment where foot-and-mouth disease had not appeared and where these products were tested for foot-and-mouth infection before they were marketed. After repeated tests involving 62 animals, one of the last series developed the disease, demonstrating that the serum was the source of infection. I mention these cases in order to show that one has to be not only a Pasteur to investigate these diseases, but he must be a Sherlock Holmes as well.

Although up to the present I have not discovered any single case of foot-and-mouth disease in this country, yet this is no proof that the country will always be immune, for there is the danger of importing infected animals from European countries into Venezuela. Up to the present no cattle have been introduced here from the Argentine, but occasionally a few pedigree animals are introduced from Europe in order to improve the old Spanish breed of cattle here. As far as this is concerned, I have always impressed upon the Government to put measures in force to prevent any possibility of allowing an infected animal to enter the ports of Venezuela.

Clinical Articles

Retention of Part of the Placental Membrane in a Mare.

By HERBERT BUCKINGHAM, M.R.C.V.S.,
Norwich.

SUBJECT.—A heavy van mare, six years old.

This animal was bought by a city firm as being a virgin mare.

I was called to see her and found a full-time dead foal and a large portion of the placental membranes on the floor.

When I examined the latter I discovered they were minus about six inches in one horn of the uterus. I then explored the uterus and found I could just touch a few strings of the missing placenta, but could not grasp them firmly enough to extract it.

I tried very strenuously to do so, but failed; so they were left there, and I fully expected the mare to be very ill.

I applied internal antiseptic agents and gave a bold dose of aloes. The next day her temperature went up to 104. There was slight straining—she purged freely and there was very little discharge from the uterus.

For a few days she continued to strain a little, her temperature gradually dropped to normal and she recovered and went to work in 14 day's time from the date of foaling.

I have attended a large number of mares suffering from retention, and until this case I have always succeeded in extracting all the membranes.

When retention takes place for only a few hours in the mare, more often than not, in my experience, fever in the feet, metritis, or lung trouble often appear and I have generally found it associated with grave consequences. Thus I was agreeably surprised to find this mare ail so little and recover so quickly.

Death Due to Punctures of Heart Vein.*

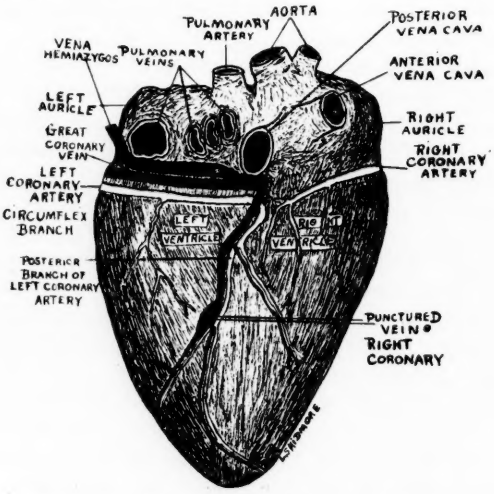
By L. V. SKIDMORE,
University of Nebraska, Lincoln, Nebraska.

HISTORY OF CASE.—A Jersey cow, three years and nine months old, weighing 860 pounds, was milked at 5.30 a.m., March 11th, 1928, at which time she appeared normal in every respect. At 11 a.m.,

* Published with the approval of the Director as Paper No. 58, Journal Series, Nebraska Agricultural Experiment Station.

5½ hours later, she was found dead in the yard, lying on the right side. No previous signs of illness were observed by the herdsman. This animal had been pregnant twice previously, and at the time of death was carrying a seven-months-old fœtus. A tentative diagnosis of traumatic pericarditis was made.

POST-MORTEM EXAMINATION.—There was no evidence of any bloody discharge from the body openings. Since death had occurred so suddenly, blood smears were made and examined to exclude the possibility of anthrax which might have been introduced with shipped-in feed. The examination for anthrax proved negative. The right side of the body was examined for swellings, but none were found. The animal was then rolled over on the left side and likewise examined for swellings with negative findings.



DRAWING OF COWS HEART SHOWING PUNCTURED VEIN FAT REMOVED FROM CORONARY GROOVE TO EXPOSE BLOOD VESSELS.

An incision was made through the skin from between the angles of the jaw bone to the region of the anus. The skin on right side and right fore-leg were removed. The right hind-leg was laid back by cutting into the coxofermoral joint. The abdominal cavity was now opened by cutting through the middle of the abdominal wall from the pubis to the xiphoid cartilage. Another incision was made from the pubic region to just anterior to the external angle of the ilium to the region of the lumbar vertebræ. An incision was now made from the

region of the xiphoid cartilage along the posterior border of the last rib to the lumbar region. The flap of flesh was removed by cutting parallel with the lumbar vertebræ. The asternal ribs were separated by cutting between them, and then each rib was pulled back until it broke near the costo-vertebral articulation.

EXAMINATION OF THE ABDOMINAL ORGANS.—The omentum and intestines were normal. The liver was slightly congested. The divisions of the stomach were now carefully examined. The middle fore-part of the reticulum (honeycomb) was found to be firmly adhered in circular fashion to the diaphragm for an area of about three inches in diameter. An incision was made into the reticulum and the contents carefully removed and examined. The contents consisted of food material and two loose four-penny nails. A small piece of brass wire four inches long and bent fish-hook-like at one end, was felt in the region where the reticulum adhered to the diaphragm. The wire penetrated three mucous folds surrounding celluæ reticuli, and also the wall of the reticulum and diaphragm.

EXAMINATION OF THE THORACIC CAVITY.—The ribs of the thoracic cavity were cut through with a saw a little below their costo-sternal articulations. The ribs were separated by cutting between them. Each rib was pulled back until it broke near its costo-vertebral articulation. The thoracic cavity was now exposed. The lungs were congested. Part of the right lung lobe was removed to expose the heart. The pericardial sac was tensely filled with clotted blood, and it was observed that the wire had punctured the pericardial sac. The heart sac was incised and most of the clotted blood removed.

Upon examination of the heart it was found that the brass wire had punctured, several times, the right coronary vein (according to Sisson) (1); v. cordis media (Ellenberger and Baum) (2); right ventricular vein (Montané and Bourdelle) (3) (see drawing). Careful examination of the artery in the same region proved that it had not been punctured. The venous punctures accounted for the escape of blood into the pericardial sac, its consequent filling and clotting, subsequent death being due to cessation of heart beats. Apparently the pressure and movements of the abdominal organs and of the fœtus combined with the diaphragmatic action resulted in a forward and backward movement which resulted in numerous punctures of the heart vein.

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(2) Ellenberger, W., und Baum, H.: "Handbuch der Vergleichenden Anatomie der Haustiere" (1915), pages 606-607.
(3) Montané, L., et Bourdelle, E.: "Anatomie Régionale des Animaux Domestiques." II, Ruminants (1917), pages 241, 242, 243 and 244.

Some Clinical Case Notes.

By V. B. JONES, M.R.C.V.S.,
The Wonersh Kennels, Guildford.

Filled Frontal Sinus.

A KEES-HOND dog, aged. History of becoming lethargic and dull, and with a habit of whimpering and holding his head on one side as if he had toothache.

After a somewhat lengthy examination I decided there was a filled frontal sinus on the left side; this diagnosis I confirmed by a skiagraph. Operated, under morphia and a local anæsthetic, by trephining over the sinus, removing a mass of gelatinous-mucous-like material, which was drawn away in a string. The cavity was then washed out with normal saline solution until a free flow was obtained down the nostril, packed with a Eusol swab and bandaged. After 48 hours, however, the dog still continually whimpered and cried, so that the owner felt that it would be kinder to destroy the subject. I wonder if the increased whimpering was due to the onset of meningitis, or whether the case would have done well?

Severed Tendo-Achilles.

A TERRIER, with a history of having jumped through a window and very badly cut his leg down to the bone above the hock, some months previously.

When seen, the dog was using the solar surface of the leg from the hock down as a foot. Operated, under a general anæsthetic, removing the fibrous connective tissue which had replaced and joined the cut ends of the tendo-achilles, cleaned up the severed ends, re-united the proximal and distal ends of the involved tendons by each a single Chinese twist suture. Sutured the tendons, sheath and skin, splinted the leg, providing a window for dressings.

The wound healed by first intention, and in four weeks the dog was walking freely and apparently quite normally. Lucky!

Coal Gas Poisoning.

A BULLDOG. History of progressive dullness and continual salivation for 14 days. Temperature, 99°. Pulse, soft and sluggish. Pupils, dilated. Membranes, normal. Slightly enlarged and tender glands, including the testicles. Appetite capricious. Motions, normal. No tumour or foreign body found on palpation or by skiagraph. Diagnosis, some narcotic poisoning, possibly belladonna.

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The dog progressively got duller, still copiously salivating. He showed a curious extra-abdominal contraction after each expiration (broken-winded effect). After a further seven days he could recognise no one. Complete inappetence and started doing spasms, drawing up the head by a series of jerks, until the head and neck were fully extended, remained in this position for some seconds and then dropped the head to normal. Symptomatic treatment was adopted, including caffein, normal saline injections and albumen water. The last four to five days he started vomiting saliva and could not keep down his food. He was fed rectally, etc., but got rapidly very weak and died quite quietly, apparently from sheer exhaustion. Unfortunately I was unable to make an autopsy.

Mr. Guy Sutton, F.R.C.V.S., saw this case in consultation and suggested delayed coal gas poisoning. The dog, I afterwards found, was very fond of lying very close to a gas fire.

Urticaria ?

A GREAT DANE suddenly developing a cutaneous eruption in the shape of small, more or less, raised circular areas of the size of a sixpenny piece. They appeared chiefly about the head, cheeks and loins and were associated with an intolerable pruritis. There were no observable inflammatory or vesicular premonitory signs, the vein just raising and in some places falling off or being scratched off and leaving the small areas, which in places where no scratching or biting could mask the true appearance, seemed to be quite healthy-looking skin that had been slightly raised by some infiltration above the normal body surface. These raised areas quickly spread all over the body. The poor beast continually scratched, rubbed, bit and tore at herself in an uncontrollable manner. No skin dressing (including Odylen) appears to have any effect, nor can I find anything to allay the violent irritation. Applications of 5 per cent. phenol, Tinc Benzoin Co., Lin. Sulp. Co. ; Vetiod ; Sod. Bicarb. swabs, simple ointments, etc. etc., have all proved valueless. Internal treatment with laxatives and injections of arsenic appear to be inefficacious. At the time of writing, after a course of five weeks, it appears to be subsiding. The pathological laboratory could find nothing in deep scrapings, nor is the condition contagious. Is it an urticaria ?

Abdominal Injury.

A DANDIE DINMONT bitch with history of having been run over by a touring car some months previously, with no apparent damage. On examination she showed much accelerated and laboured breathing.

Pulse hard and frequent. Temperature subnormal. On auscultation the lungs appeared to be normal. She showed great pain on pressure over the abdominal muscles, particularly about the right kidney region ; however, she so tensed her muscles that satisfactory palpation was impossible. The urine appeared normal, as also were her fæces. Treated with sod. sal., gr. *v* every two hours until easier and gave local applications of Tinct. Belladonnæ Co ; Lin. Saponis Meth. Aa. The pain eased for two days, when it recurred with even more severity. Poulticed with antiphlogistine. On removal of this poultice a most beautiful moist impression of the right ovary and right horn of the uterus, with part of the body and part of the left horn was shown—obviously the seat of inflammation and pain. Further poulticing eased the pain so much that operative measures have been postponed.

In this connection it is of interest to note how often an antiphlogistine poultice will diagnose the seat of an internal inflammation for one ; the moist spot definitely locating the seat of the trouble.

Tonsilitis.

An outbreak of acute tonsilitis has occurred among the dogs of this district. The tonsils becoming as large as small mulberries and of a bright strawberry colour, and giving often very great pain. They occasionally show small pin-head ulcers and sometimes pin-point necrosis. They all quickly subside if painted t-i.d. with one per cent. silver nitrate solution, together with external cold compresses.

The condition is apparently not contagious, since of several dogs kennelled together only one may suffer—but why so many cases of the sort within a few weeks ?

Œsophageal Diverticulum.

A Sealyham, with a history of gradually falling off in condition over a period of months. Clinically showed anæmia, very enlarged mesenteric glands. The owner stated the dog was a poor feeder, but that she had seemed normal otherwise. I suspected a mesenteric tumour with possible metastasis. Tonics, etc., proved valueless, and after a few months the dog was chloroformed ; autopsy showing a thoracic œsophageal diverticulum the size of a tangerine. There appeared to be no foreign body to have caused the diverticulum ; perhaps a swallowed section of marrow bone had become lodged there and after some months absorbed.

Harmful Drench.

A Polo Pony with a history of suddenly going off its feed entirely and looking very tucked up and ill. Temperature up one degree, very

slight pharyngitis and bronchitis. Why so ill? Pulled out the tongue to complete the examination and found nearly all the mucous membrane of the mouth sloughing. The groom had thought the horse could "do with a dose" and had found some old bottle marked medicine, the contents of which he had straightway poured down the poor beast—it was strong ammonia. Swabs of glycerine very soon soothed the mouth and in four days the horse was eating normally. How quickly mouth wounds do heal!

Fright Disease in Dogs.

By N. S. MAYO, V.S.,
Abbott Laboratories, North Chicago, U.S.A.

THIS subject is particularly interesting to us in America, because we have been attempting to deal with this problem rather unsuccessfully for a number of years.

"Fright disease," "running fits" or "canine hysteria" first came into prominence in the Southern States, and has gradually extended, until it is now found practically all over the United States.

No definite scientific work on the causative agent of this disease has been reported, but many theories regarding the cause have been advanced. Some think it is of dietetic origin, others attribute fright disease to entozoa, while some consider it to be a form of nervous distemper.

The line of treatment generally adopted is to empty the digestive tract promptly and follow with intestinal antiseptics. Hypnotics are administered and the dog placed in a comfortable quiet place. The dog is examined for intestinal parasites and if found proper treatment given. A rather heavy meat diet is also recommended.

The conditions under which fright disease is generally observed makes it difficult to carry on definite continuous scientific study, but the general extension of the disease is strongly suggestive that some specific organism is the causative factor.

A Physiological Anomaly—Lactation in a He-Goat.

By A. C. AGGARWALA, B.Sc. HONS., M.R.C.V.S.,
Professor, Punjab Veterinary College, Lahore.

A PAHARI (mountain) he-goat, about four and a half years old, was brought to the College Outdoor Clinic on March 5th, 1927 (Case No. 2640, property of Mr. W. T. Biscoe, N.W.R., Lahore) for

castration. While examining the testicles two well-developed teats about two and three-quarter inches long in front of the testicles were found. Further palpation did not reveal the existence of any well-defined mammary glands. On pressing the teats a fine white stream of milk was drawn out. This peculiar physiological anomaly of lactation in the he-goat was also witnessed by the members of the Royal Agricultural Commission, who had come on an official visit to the institution that day. Nearly two and a half ounces of milk were collected, but the exact quantity of the milk yielded was not measured. On analysis it gave the following composition :—

	He-goat.	Average Composition of Goat's Milk.
Specific Gravity	1·047	1·0305
Water	83·662 per cent.	86·88 per cent.
Fat	3·60 ,,	4·07 ,,
Total Solids	16·338 ,,	13·12 ,,
Mineral Matter	0·535 ,,	0·85 ,,

Fig. showing the lactating glands.

The animal was castrated with Burdizzo's Emasculator and kept in the hospital for two days in order to determine the extent of milk secretion, but on each of these days the animal did not yield more than a few drachms of milk. This lack of secretion was attributed to some reflex action following castration.

The animal was again examined after about a year on March 30th, 1928. The teats had atrophied and were only one inch in length. All attempts at milking failed.

Abstracts

The Poultry Industry in 1927.*

By EDWARD BROWN, LL.D., F.L.S.

WITH exception of the war years, when owing to shortage of feed the stocks of poultry were greatly reduced, 1927 has been more difficult than any period dealt with in the 33 years in which these annual reviews have been published. The reasons are manifold—namely, relatively bad trade, heavy taxation and an unfavourable season. It is satisfactory, however, to record that poultry husbandry, whether on the part of those who specialise in this pursuit or of general farmers, has come through remarkably well, better, in fact, than in any other branch of husbandry. Profits may not have been quite so great owing to a drop in prices for eggs during part of the year. These, however, have not fallen seriously. It is suggestive that so far as fowls are concerned there was in 1927 a substantial increase in numbers over 1926.

There are two important signs which indicate a continued progress. First, that reports received from those who are breeders of stock, etc., for sale are to the effect that the demand has on the whole been satisfactory ; and, secondly, the increasing interest evinced by general farmers in egg and poultry production. Interesting reports published during the year have again emphasised the fact that poultry are the most profitable of farm stock. Whilst there appears to be a temporary lull in additions to the number of poultry farmers *per se*, so long as farmers increase their flocks the output of supplies will advance and breeders maintain their important contribution to poultry husbandry. Theirs is the key to the position. It involves responsibilities which have not as yet been adequately realised.

Keen disappointment has been expressed by those who have strenuously agitated for the marking of imported eggs consequent upon refusal of the Inquiry Committee appointed by the Minister of Agriculture in conformity with the Merchandise Marks Act, 1926, to recommend an Order in Council making marking imperative until methods of marketing have been brought into conformity with present-day requirements. The need for more effective marketing has been urged for years, largely in vain. Producers have been negligent by reason of proximity to the markets. The year 1927 will signalise a new era if refusal of a marking order compels adoption of methods by which British eggs will be supplied of the highest quality, by raising standards in respect to size and appearance, and that eggs are marketed

*Abstract from an article in "Poultry-Keeping," February 4, 1928.

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rapidly penalising producers and traders who fail to do so. Were such system generally adopted the British egg would have no serious rival. Neglect has given imported eggs the place these have attained. The proposals by the Poultry Advisory Committee to the Ministry of Agriculture for adoption of standards of quality and size of eggs indicates that at last this question is being seriously dealt with. It is a valuable piece of constructive work, and if applied will alter the whole aspect of home supplies.

The menace of disease is ever present with us, and is the most serious question keepers of poultry have to meet. Several outbreaks of a disastrous nature have taken place during the year and apparently without any connection. The Ministry of Agriculture's Veterinary Laboratory is now available for the study of these. That is the first step. Of supreme importance is prevention, which can alone be achieved by the adoption of hygienic methods and by prohibiting the sale of infected birds individually or at auctions and markets, where inspection is generally a farce, if there be any at all.

From the Trade and Navigation Returns for December, 1927, the following records of imports in comparison with 1926 are taken, to which I have added the percentages of increase or decrease from the respective countries enumerated:—

Quantities of Eggs in Shell Imported into Great Britain and Northern Ireland, 1926 and 1927.

Country of Origin.	1926. gt. hds.	1927. gt. hds.	Percentage Increase or Decrease. 1927 over 1926.
Lithuania	79,638	11,445	dec. 85·62
Denmark	5,625,380	5,679,640	inc. 0·96
Poland	2,721,512	3,387,956	inc. 24·48
Netherlands	1,985,416	2,359,895	inc. 18·88
France	588,711	429,509	dec. 27·04
Italy	203,221	87,407	dec. 56·98
Yugo-Slavia	3,516	1,100	dec. 40·27
Egypt	672,167	668,544	dec. 0·53
China	1,232,305	688,183	dec. 44·15
United States of America	60,879	92,880	inc. 52·56
Irish Free State ...	4,427,769	5,051,523	inc. 11·82
Canada	156,350	41,367	dec. 73·54
Other Countries ...	4,368,531	5,848,074	inc. 33·86
Totals	22,126,396	24,347,523	inc. 10·04

The egg imports are 2,222,128 great hundreds, or 10·04 per cent. greater than in 1926, mainly due to larger supplies from Poland, the Netherlands, the Irish Free State, and other countries. The most notable decreases are France, Italy and China. The further drop in Canadian supplies is explained by the prices attained in the Dominion as a result of greatly increased consumption.

The total values for 1927 and average values in 1926 and 1927 are given in the following table :—

Total and Average Values of Imported Eggs.

Country of Origin.	Totals. 1927. £	Average Values per gt. hundred. 1926. s. d.	1927. s. d.
Lithuania...	6,192	11 6½	10 7¾
Denmark	4,592,587	16 7½	16 2
Poland	1,547,506	10 0¾	9 1½
Netherlands	1,711,810	16 0¾	14 6
France	320,958	12 5¾	14 11¼
Italy	74,521	17 1¼	17 0½
Yugo-Slavia	1,128	17 3½	20 3¾
Egypt	290,609	8 8¾	8 8½
China	399,835	11 1½	11 4½
United States of America ...	64,556	14 5¼	13 10¾
Irish Free State	3,126,638	13 0	12 4½
Canada	37,401	17 1½	18 0¾
Other Countries	3,745,193	14 2¼	12 9½
Totals	15,918,925	14 1½	13 0¾

The declared value of imported eggs in 1927 was £549,491 above those of 1926, or 3·57 per cent. The average prices declined by 1s. 0¾d. per great hundred, or 7·51 per cent. The high averages from some countries is due to shipments being made mainly in the periods of higher values.

Of dried and liquid eggs 97·71 per cent. were received in 1927 from China, including Hong Kong. The following table indicates, after deducting re-exports, an increase in 1927 as compared with 1926 of 9·88 per cent. in quantities and 5·16 per cent. in total values :—

	Quantities. cwts.	Values. £	Per cwt. s. d.
1926	582,456	2,915,775	100 1
1927	640,028	3,066,344	95 9

Imports of live and dead poultry into Great Britain and Northern Ireland in 1927 were :—

Country.	Quantities.	Values.
Alive—	No.	£
Irish Free State	1,104,911	199,922
Other Countries	217,534	23,004
Total Alive	1,322,445	222,926
Dead—	Cwts.	£
France	76,224	477,382
Hungary	33,873	177,516
United States of America	34,440	236,461
Irish Free State	112,319	690,055
Other Countries	294,004	1,175,145
Total Dead	505,860	2,756,559
Less Re-exports	12,441	76,833
Net Total Dead ...	493,419	2,679,726
Gross Total, Poultry		£2,902,652

The quantities of dead poultry imported in 1927 show an increase over 1926 of 91,332 cwts. and £643,636 in values. The average value per cwt. was 108s. per cwt. in 1927 and 112s. 4d. in 1926, a decline of 4s. 4d. per cwt.

The net import values of eggs and poultry in 1927 were :—

	£
Eggs in shell	15,918,925
Eggs not in shell, less re-exports	3,066,344
Poultry, less re-exports	2,902,652
Total Values of Imports	£21,887,921
Increase over 1926	£927,698

Export values of live poultry in 1927 were £14,995, and of British dead poultry £33,637.

Estimates based upon census returns and values of eggs and poultry are :—

	£
Estimated production in England and Wales	23,504,161
Estimated production in Scotland	2,600,399
Estimated production in Northern Ireland	3,386,051
Imports of eggs and poultry, including dried and liquid eggs, less re-exports	21,887,921
Total (Wholesale) Consumption ...	£51,378,532

Correspondence

"Appeal for Spontaneous Tumours of Animals for Study."

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—

My researches have now reached the stage at which it is possible to cure either implanted carcinomata or sarcomata of rats by means of vaccine treatment.

In order, if possible, to make further progress it is essential to discover whether similar results can be obtained with spontaneously occurring tumours.

I therefore appeal to all those coming in contact with mice, rats, rabbits, cats or dogs suffering from spontaneous tumours to send them *alive* to me at the Lister Institute, S.W.1.

I am very hopeful that if sufficient material is in this way available, progress can be made. I shall be pleased to repay any reasonable expense involved.

Yours faithfully,

THOMAS LUMSDEN.

Lister Institute of Preventive Medicine,
Chelsea Bridge Road,
London, S.W.1.
May 23rd, 1928.

Parliamentary News

A Bill to Prohibit the Vivisection of Dogs.

(Presented by Sir Robert Gower, supported by Col. Moore, Mr. Bromley, Mr. Macquisten, Mr. Thurtle, Capt. Arthur Evans, Mr. Sexton and Mr. Radford.)

BE it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows :—

Prohibition of Painful Experiments on Dogs.

1. Notwithstanding anything in the Cruelty to Animals Act, 1876 (hereinafter referred to as "the principal Act"), it shall be unlawful to perform any experiment of a nature calculated to give pain or disease to

any dog for any purpose whatsoever, either with or without anæsthetics, and no person or place shall be licensed for the purpose of performing any such experiments.

Penalties.

2. Any person performing or assisting or taking part in performing any such experiment on any dog shall be guilty of an offence against the principal Act and punishable accordingly, and the provisions of this Act shall have effect as though they formed part of that Act.

Short Title and Citation.

3. This Act may be cited for all purposes as the Dogs' (Protection) Act, 1928, and the principal Act and this Act may be cited together as the Cruelty to Animals Acts, 1876 to 1928.

Sir R. Gower (Hackney, Central, U.) moved the second reading of the Protection of Dogs Bill.

Lieut.-Com. Kenworthy (Hull, Central, Lab.), in seconding, said that all over the country there were two classes of people who were in favour of prohibiting the vivisection of dogs, first of all those who were dog lovers, and, secondly, those who on grounds of humanity and decency of feeling objected to the use of dogs for these experiments. Other animals could be used. Many learned theologians, including the Home Secretary, believed that dogs had souls. (Laughter.) [Sir W. Joynson-Hicks indicated dissent.] The dog had, at any rate, more understanding and more fidelity than many men. (Cheers.)

Dr. Little (London University, Ind.) was speaking against the Bill when, at 4 o'clock, the debate was adjourned under the rules of the House. —*The Times*, April 20th, 1928.

A Bill to Amend the Law with Respect to the Exportation of Horses.

(Presented by Mr. Ammon and supported by Col. Applin, Mr. Viant, Mr. Broad, Mr. Parkinson and Mr. Compton.)

BE it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows :—

Amendment of Section 1 *of Diseases of Animals Act*, 1910.

1.—(1) The prohibition contained in section one of the Diseases of Animals Act, 1910, as amended by the Exportation of Horses Act, 1914, on shipping or attempting to ship unfit horses in certain cases shall be extended so as to include any horse unless certified by a veterinary inspector in accordance with that section to be in the case of a horse (other than an ass) not more than seven years of age and to be of not less value than thirty pounds, and in the case of an ass to be not more than seven years of age and to be of not less value than three pounds, and accordingly subsection (1) of that section as amended by the said Act of 1914 shall have effect as though after the word " suffering " there were inserted the words " and in the case of a horse (other than an ass) to be not more than seven years of age and to be of not less value than thirty pounds, and in

the case of an ass to be not more than seven years of age and to be of not less value than three pounds."

(2) The said section one shall have effect as though the following subsection were substituted for subsection (2) thereof:—

(2) If any horse examined under this Act is in the opinion of the veterinary inspector in such a physical condition that it is cruel to keep it alive or to be permanently incapable of being worked without suffering the inspector shall forthwith slaughter it or cause it to be slaughtered with a mechanically operated instrument suitable and sufficient for the purpose, and no compensation shall be made to the owner of the said animal.

Amendment of Sections 1 and 3 of Diseases of Animals Act, 1910.

2. The provisions of the Diseases of Animals Act, 1910, as amended by the Exportation of Horses Act, 1914, and this Act shall have effect so as to include shipment in any vessel from any port in Great Britain to any port outside Great Britain, and accordingly the words " from any port in Great Britain to any port outside Great Britain " shall be substituted for the words " from any port in Great Britain to any port outside the British Isles " in sections one and three of the Diseases of Animals Act, 1910.

Short Title and Commencement.

3.—(1) This Act may be cited as the Exportation of Horses Act, 1928, and shall be construed as one with the Diseases of Animals Act, 1910, and the Exportation of Horses Act, 1914, and the Diseases of Animals Acts, 1894 to 1922, and this Act may be cited together as the Diseases of Animals Acts, 1894 to 1928.

(2) This Act shall come into force on the first day of January, nineteen hundred and twenty-nine.

News

Inauguration Ceremony of the New Veterinary Faculty of the University of Warsaw, Poland.

THE inauguration ceremony of the Veterinary Faculty of the University of Warsaw took place on October 16th, 1927, with all due solemnity. Professor Maj. Jan Gordzialkowski being the first Principal and Dr. Zajgmunt Szymanowski Vice-Principal.

The Faculty possesses eight professors, 21 assistants and 250 students. The titles granted are those of " Veterinary Surgeon " and " Doctor of Veterinary Medicine."

The school was admitted as a Faculty of the University in February last.

The first Polish veterinary school was founded at Vilna in 1806 and a second school at Warsaw in 1820. These two establishments were closed after the Russo-Polish War in 1830-31.

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In 1881 a veterinary school, teaching in the Polish language, was established at Léopol; and in 1896 the title of this school was altered to that of a Veterinary Academy, which in 1908 obtained the full rights of a university with power to confer the title of Doctor of Veterinary Medicine. In 1846 a veterinary college (with its professional course of lectures carried out in the Russian language) was opened at Warsaw and in 1884 this developed into a high scientific institution. In February 1918 the school was affiliated with the University of Warsaw and admitted directly into the Faculty.

Up to the present there have graduated some 14 pupils with the title of Veterinary Surgeon and six as Doctors of Veterinary Medicine.

International Horse Show—Novel Display by Viennese Riders and Steeds—Gold Casket Gift to Lord Lonsdale.

THE seventeenth annual International Horse Show will be held at Olympia, London, from Thursday, June 21st, to Saturday, June 30th.

A new feature at every performance will be a novel display of horsemanship and horse training by the historic Imperial Riding School of Vienna.

The Gala performances at the International Horse Show will be on Monday afternoon, June 25th, when the King George V gold trophy will be jumped for by officers of several armies, and on Thursday afternoon, June 28th, when military teams from each country jump for the Prince of Wales' cup. On Tuesday afternoon His Royal Highness will publicly present to the Earl of Lonsdale a golden casket in honour of his golden wedding.

Other notable events during the run of the Show will be coaching marathons, the scurry stakes, the handy hunter stakes, the high jump, and the amusing meet of forty of London's smartest donkeys.

University of Cambridge Professorship of Animal Pathology.

At a Meeting of the Electors to the Professorship of Animal Pathology on Saturday, June 9th, Mr. J. B. Buxton, M.A., F.R.C.V.S., D.V.H., was re-elected into the Professorship.

The Electors present were: The Vice-Chancellor, Sir H. K. Anderson; Master of Granville and Caius College, Professor T. B. Wood; Professor Dean; Professor Hobday; Sir W. M. Fletcher and Professor Nuttall.

Errata.

On p. 263 the author's name of the German work reviewed is MALKMUS and not MALKINUS. On p. 264 LEISTUNGSFAHIGLNEIL should be LEISTUNGSFAHIGKEIT.